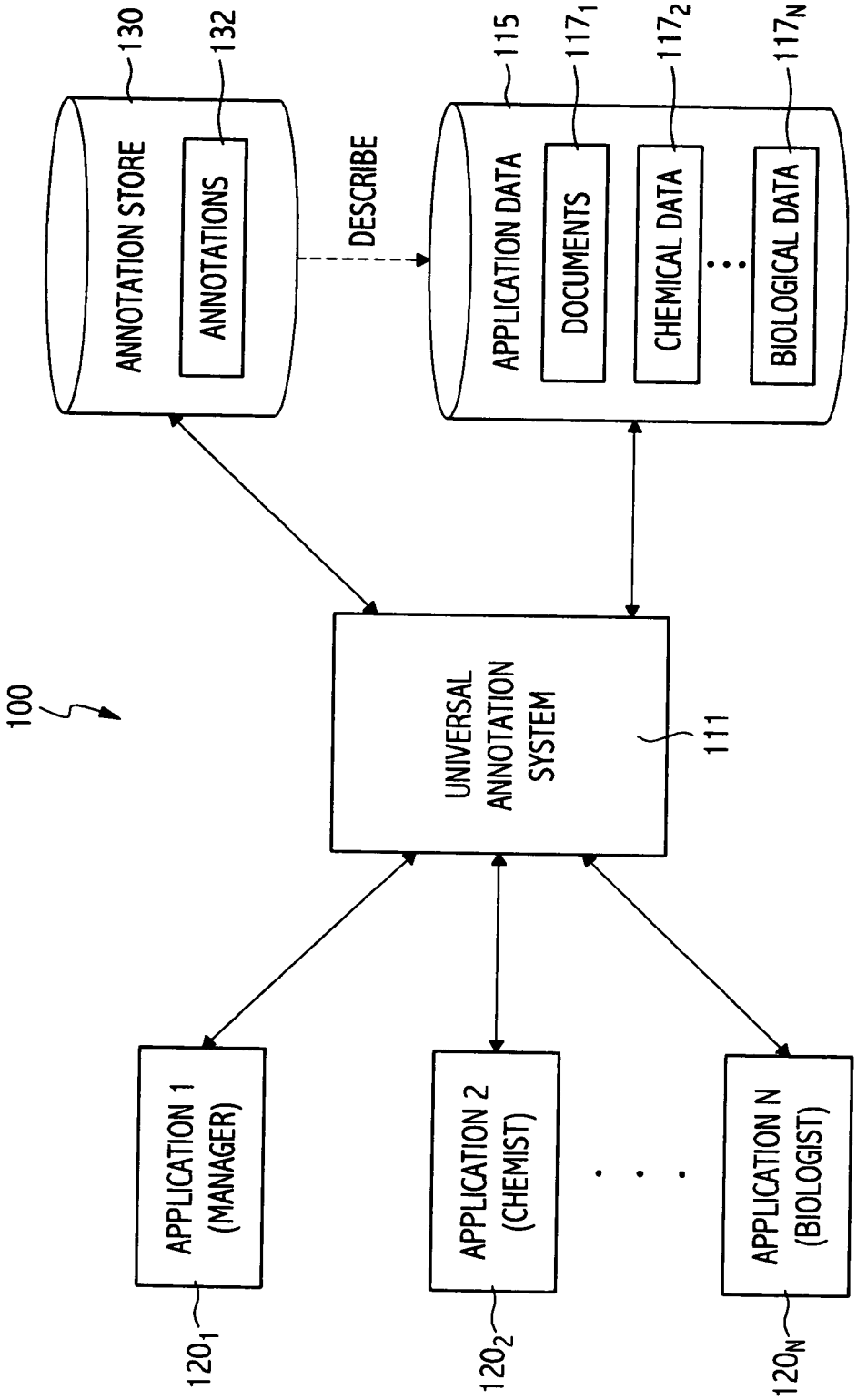
100
ANNOTATION STORE
130
ANNOTATIONS
132
DESCRIBE
APPLICATION DATA
115
DOCUMENTS
117_1
CHEMICAL DATA
117_2
BIOLOGICAL DATA
117_N
UNIVERSAL ANNOTATION SYSTEM
111
APPLICATION 1 (MANAGER)
120_1
APPLICATION 2 (CHEMIST)
120_2
APPLICATION N (BIOLOGIST)
120_N

FIG. 1

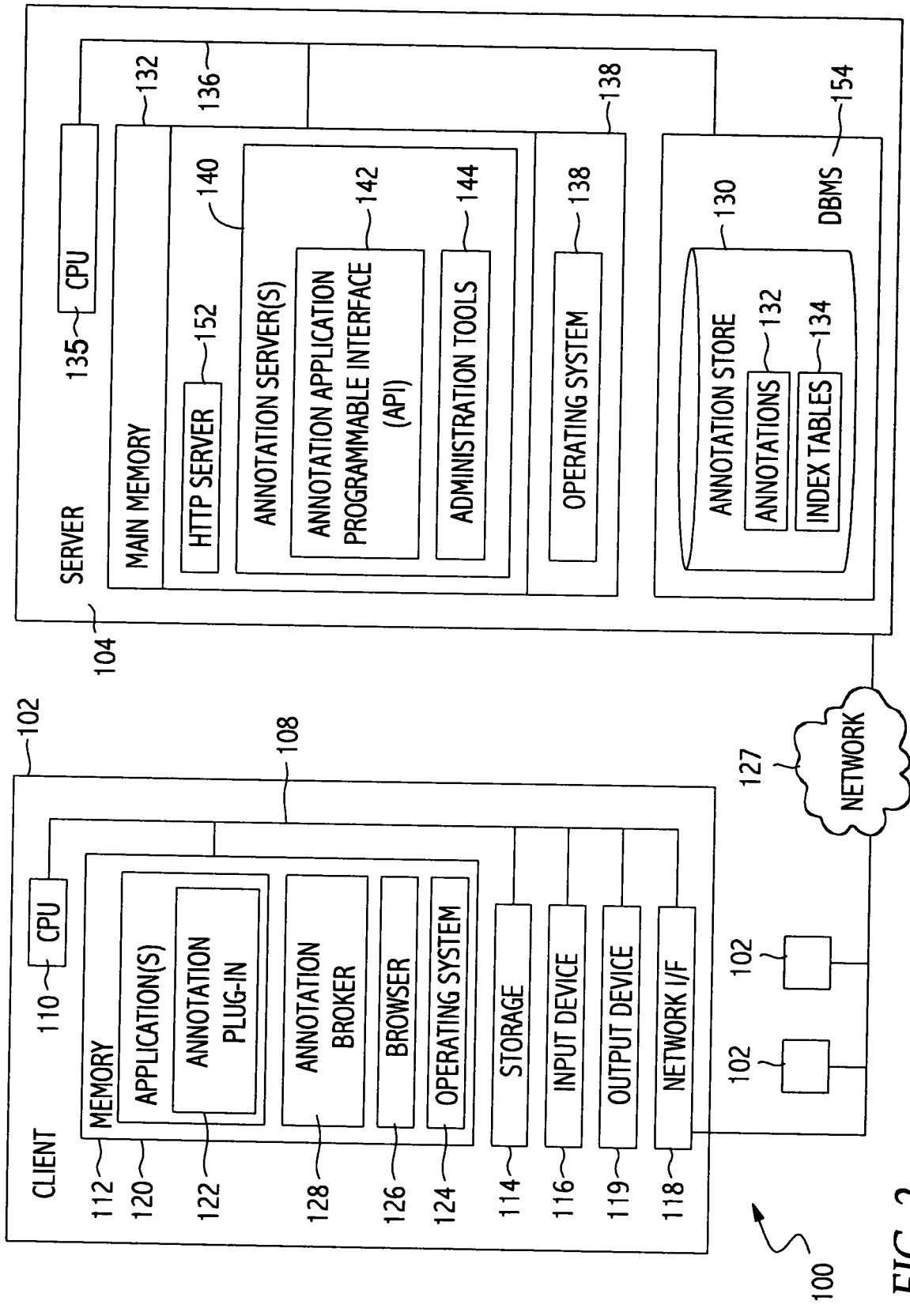
SERVER
104
CPU
135
MAIN MEMORY
132
136
HTTP SERVER
152
ANNOTATION SERVER(S)
140
ANNOTATION APPLICATION PROGRAMMABLE INTERFACE (API)
142
ADMINISTRATION TOOLS
144
OPERATING SYSTEM
138
138
ANNOTATION STORE
130
ANNOTATIONS
132
INDEX TABLES
134
DBMS
154
NETWORK
127
CLIENT
102
CPU
110
MEMORY
108
APPLICATION(S)
ANNOTATION PLUG-IN
ANNOTATION BROKER
BROWSER
OPERATING SYSTEM
STORAGE
INPUT DEVICE
OUTPUT DEVICE
NETWORK I/F
112
120
122
128
126
124
114
116
119
118
102
102
100

FIG. 2

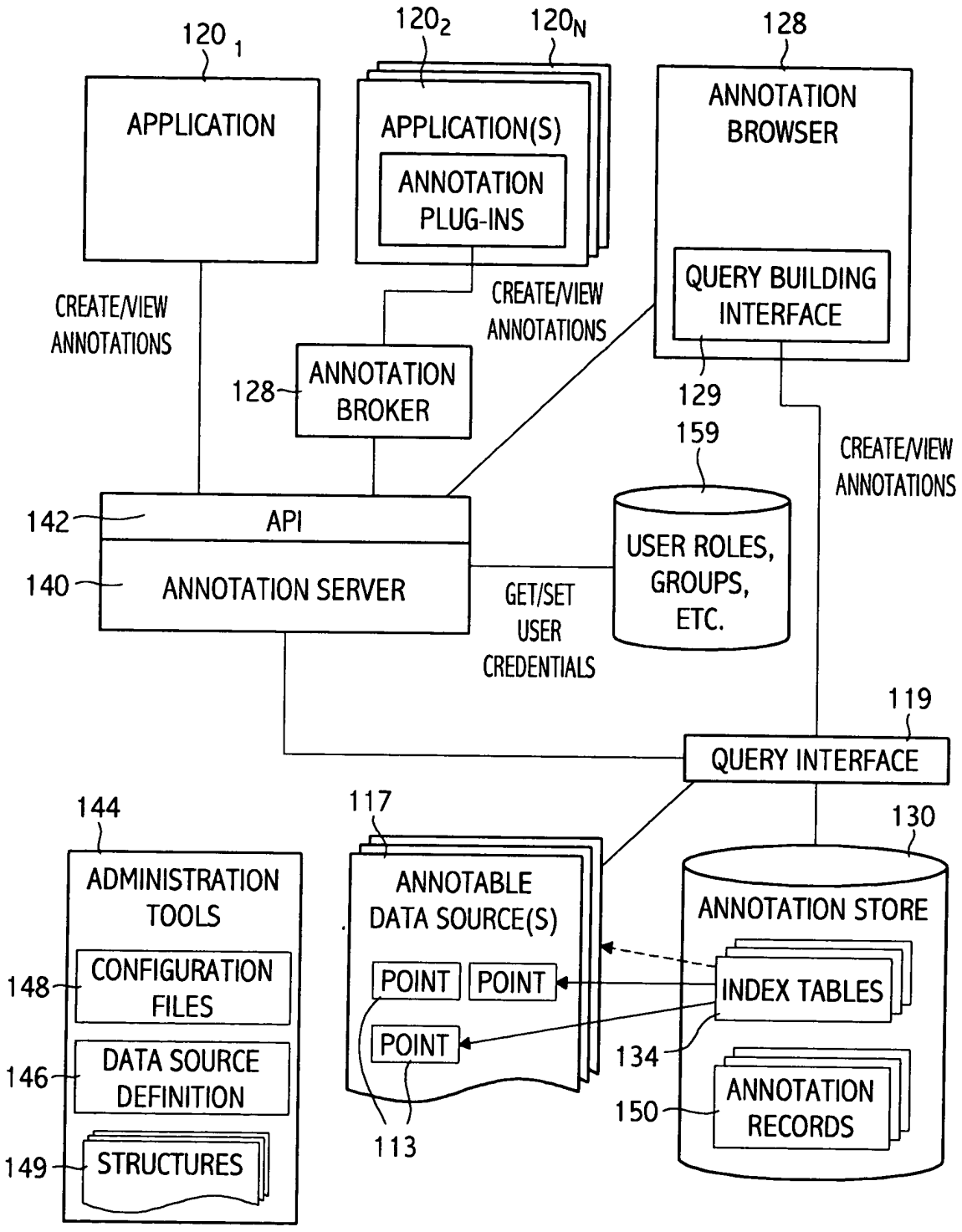
120 1
APPLICATION
120 2
120 N
APPLICATION(S)
ANNOTATION PLUG-INS
128
ANNOTATION BROWSER
QUERY BUILDING INTERFACE
CREATE/VIEW ANNOTATIONS
CREATE/VIEW ANNOTATIONS
128
ANNOTATION BROKER
129
159
CREATE/VIEW ANNOTATIONS
142
API
140
ANNOTATION SERVER
USER ROLES, GROUPS, ETC.
GET/SET USER CREDENTIALS
119
QUERY INTERFACE
144
ADMINISTRATION TOOLS
148
CONFIGURATION FILES
146
DATA SOURCE DEFINITION
149
STRUCTURES
117
ANNOTABLE DATA SOURCE(S)
POINT
POINT
POINT
113
130
ANNOTATION STORE
INDEX TABLES
134
150
ANNOTATION RECORDS

FIG. 3A

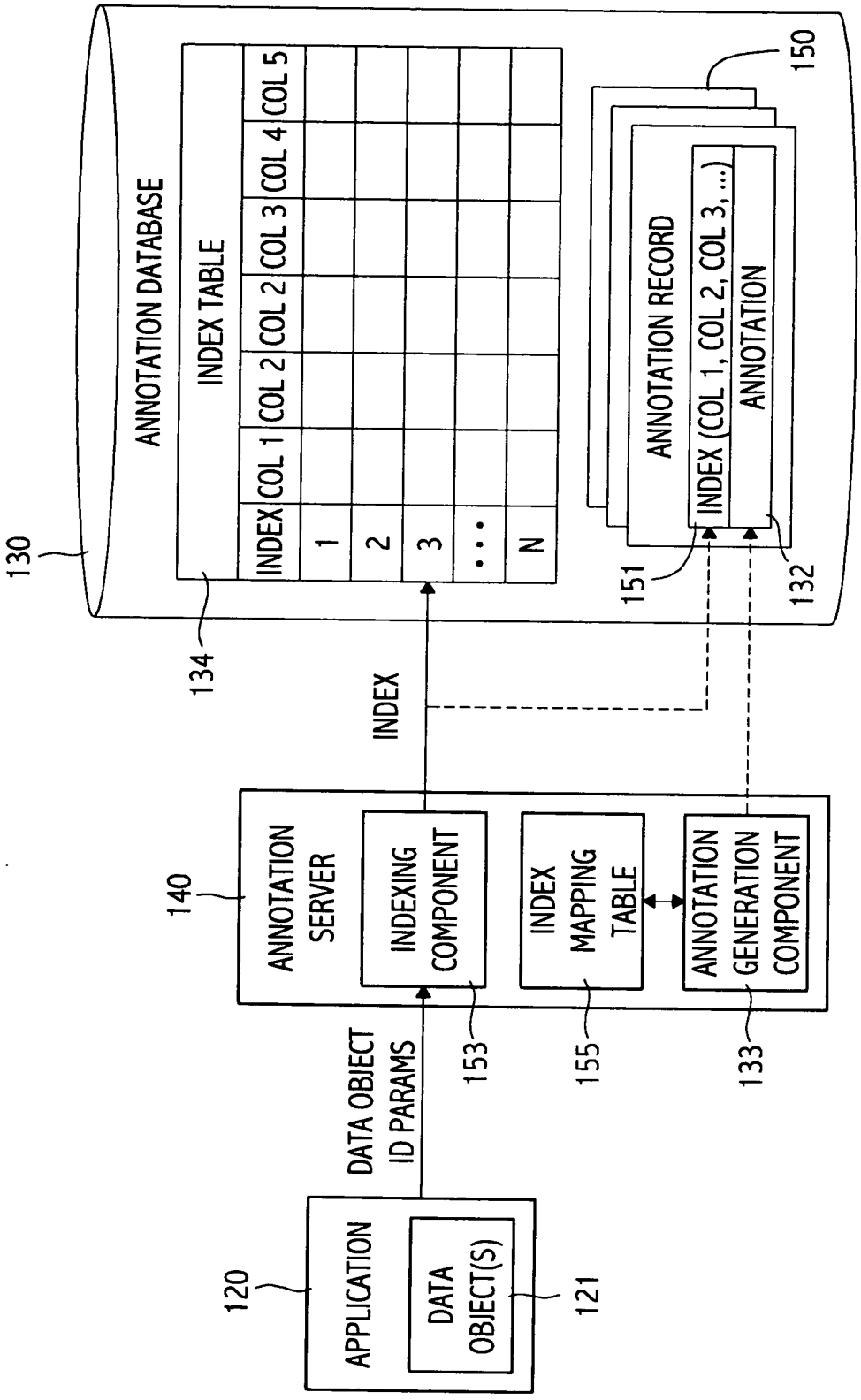
ANNOTATION DATABASE
INDEX TABLE
INDEX
COL 1
COL 2
COL 2
COL 3
COL 4
COL 5
1
2
3
N
ANNOTATION RECORD
INDEX (COL 1, COL 2, COL 3, ...)
ANNOTATION
ANNOTATION SERVER
INDEXING COMPONENT
INDEX MAPPING TABLE
ANNOTATION GENERATION COMPONENT
APPLICATION
DATA OBJECT(S)
DATA OBJECT ID PARAMS
INDEX
130
134
150
151
132
140
153
155
133
120
121

FIG. 3B

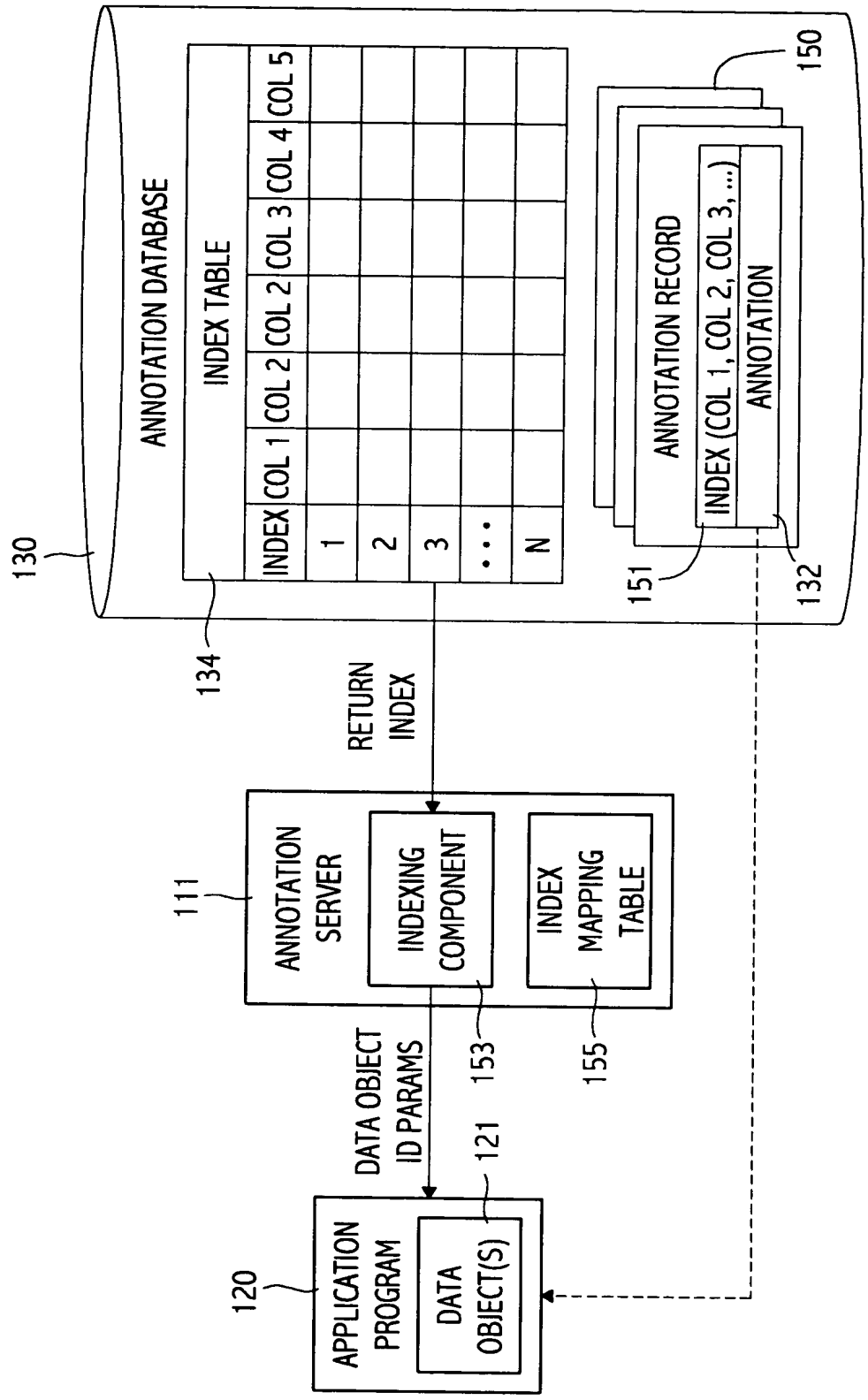
ANNOTATION DATABASE
130
INDEX TABLE
INDEX
COL 1
COL 2
COL 3
COL 4
COL 5
1
2
3
• • •
N
134
150
ANNOTATION RECORD
INDEX (COL 1, COL 2, COL 3, ...)
ANNOTATION
151
132
RETURN INDEX
111
ANNOTATION SERVER
INDEXING COMPONENT
INDEX MAPPING TABLE
153
155
DATA OBJECT ID PARAMS
121
120
APPLICATION PROGRAM
DATA OBJECT(S)

FIG. 3C

480

API FUNCTION	DESCRIPTION
QueryRoles	Get a list or roles for the user.
SetRole	Set the active set of roles for the session.
Query Structure Names	Given the data source type and subtype of the target documents and all of the points in those documents the use wants to annotate, return the list of available structures.
QueryStructureTransforms	Given an annotation type returned from QueryStructureNames API, return an array of URLs to XSL transforms.
QueryPoints	Given a GUID, and list of DataSourceVersions, return a list of data sources and the points in the data sources.
QueryAnnotationIDS	Given a list of search criteria, return an array of an annotation GUIDs that match the criteria.
GetAnnotation	Return the annotation data for a given GUID
CreateAnnotation	Create a new annotation with provided data and access control information
UpdateAnnotation	Replace specific fields in an annotation which results in a new version of the annotation
DeleteAnnotation	Delete (or hide) the specified annotation
AddPoint	Take an existing Annotation and add a new annotated point to it
DeletePoint	Delete a point from an annotation
QueryAllowedPointTypes	Return the allowed point types and subtypes given a data source type and subtype
QueryDataSourceSubtypes	Return the configured data source subtypes given a data source type

FIG. 3D

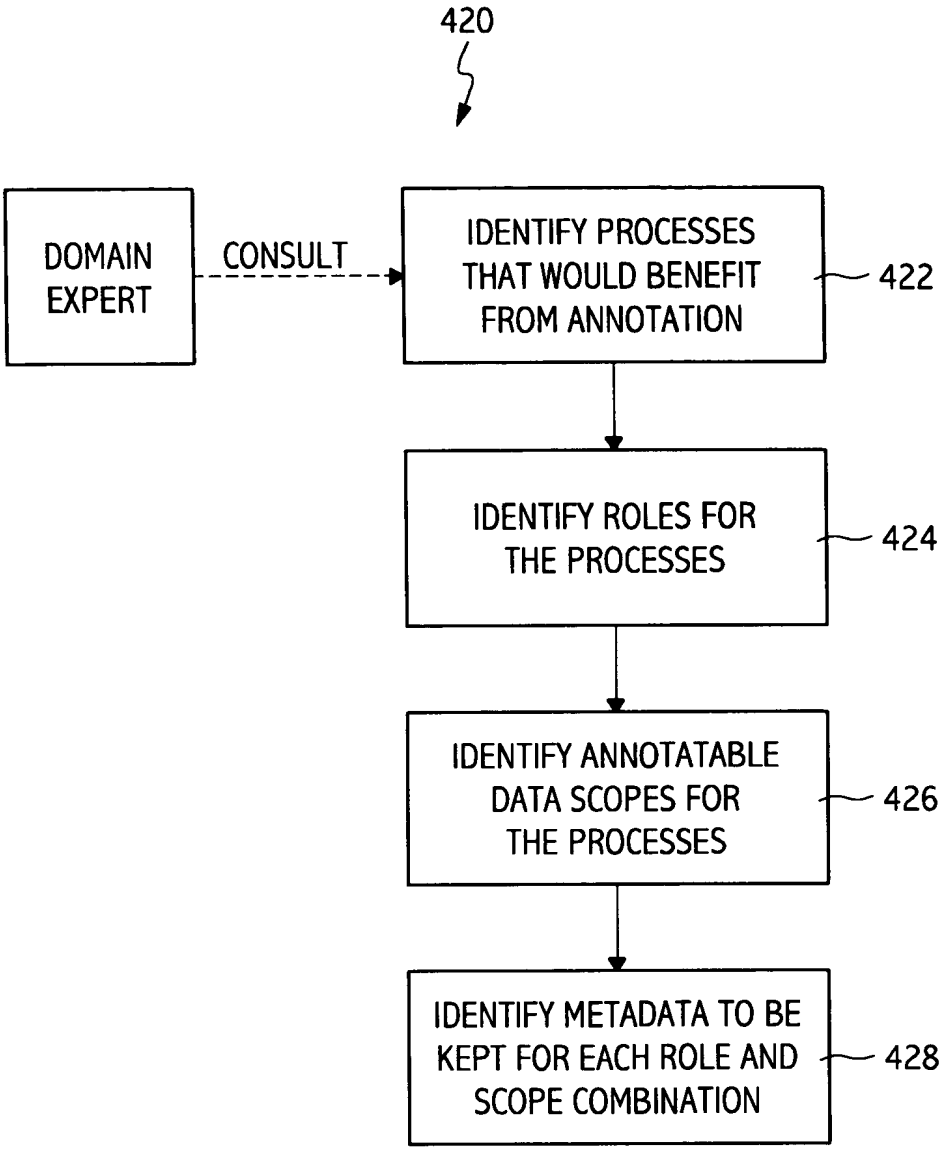
420
DOMAIN EXPERT
CONSULT
IDENTIFY PROCESSES THAT WOULD BENEFIT FROM ANNOTATION
422
IDENTIFY ROLES FOR THE PROCESSES
424
IDENTIFY ANNOTATABLE DATA SCOPES FOR THE PROCESSES
426
IDENTIFY METADATA TO BE KEPT FOR EACH ROLE AND SCOPE COMBINATION
428

FIG. 4A

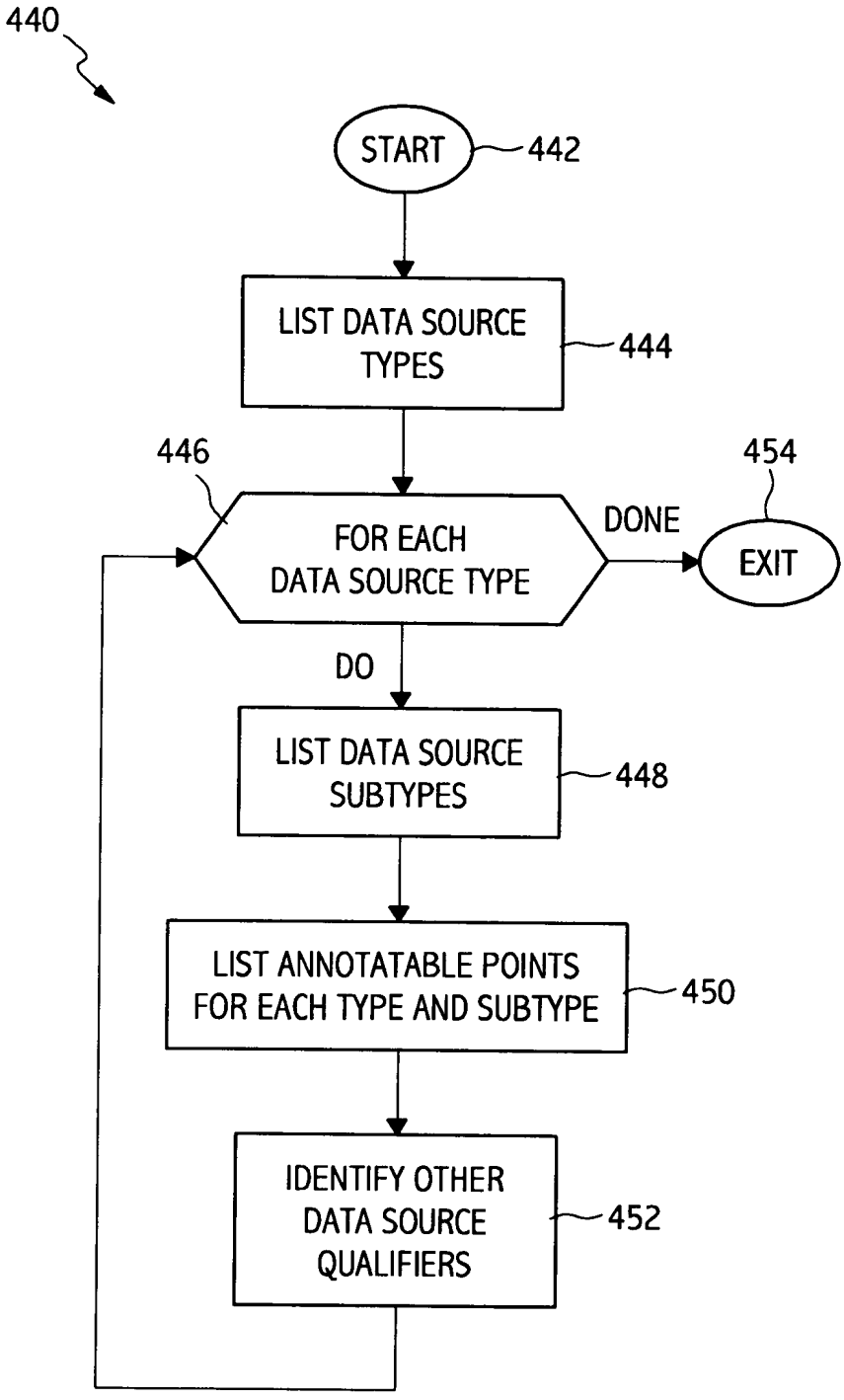
440
START
442
LIST DATA SOURCE TYPES
444
446
454
FOR EACH DATA SOURCE TYPE
DONE
EXIT
DO
LIST DATA SOURCE SUBTYPES
448
LIST ANNOTATABLE POINTS FOR EACH TYPE AND SUBTYPE
450
IDENTIFY OTHER DATA SOURCE QUALIFIERS
452

FIG. 4B

460

Data Source Type	Point Type	Meta Information
Relational (and Excel)	Table	Table Name
	Column	Table Name, Column Name
	Cell	Table Name, Key, Column Name
	Row	Table Name, Key
Word Document/HTML file	Document	Path
	Word Range	Path, Start character, End character
Spotfire File	Spot	Context, View, Marked Record, Column
	Cluster	Context, View, Marked Record, Column
	Row	Context, View, Marked Record
	Column	Context, View, Column
	File	Context, View
Pdf (requires Adobe Framemaker)	Text	Page, Start word, End word, Start of set, End of set
	Graphic	Page, Top, Left, Bottom, Right

FIG. 4C

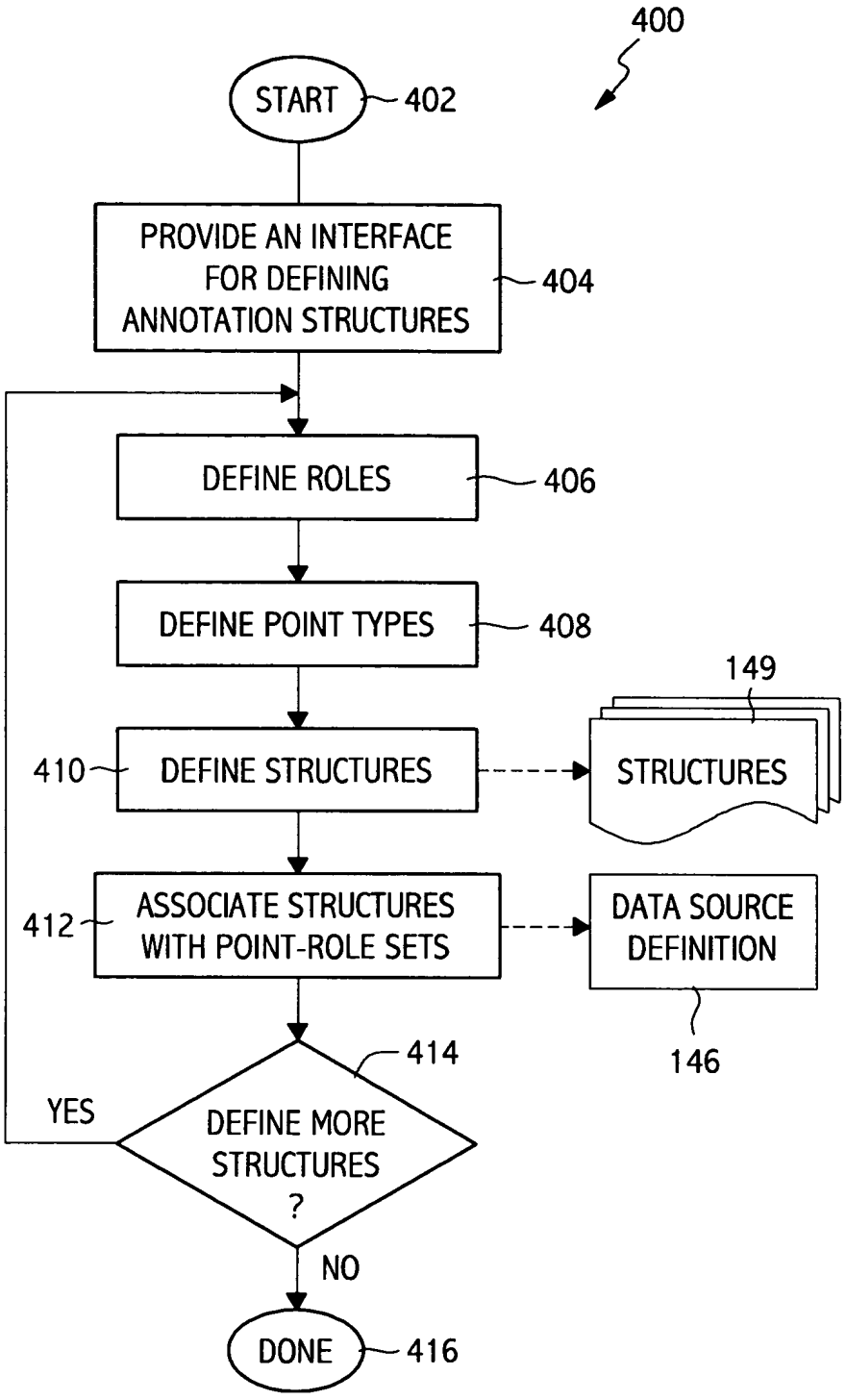
400
START
402
PROVIDE AN INTERFACE FOR DEFINING ANNOTATION STRUCTURES
404
DEFINE ROLES
406
DEFINE POINT TYPES
408
149
410
DEFINE STRUCTURES
STRUCTURES
412
ASSOCIATE STRUCTURES WITH POINT-ROLE SETS
DATA SOURCE DEFINITION
146
414
YES
DEFINE MORE STRUCTURES ?
NO
DONE
416

FIG. 4D

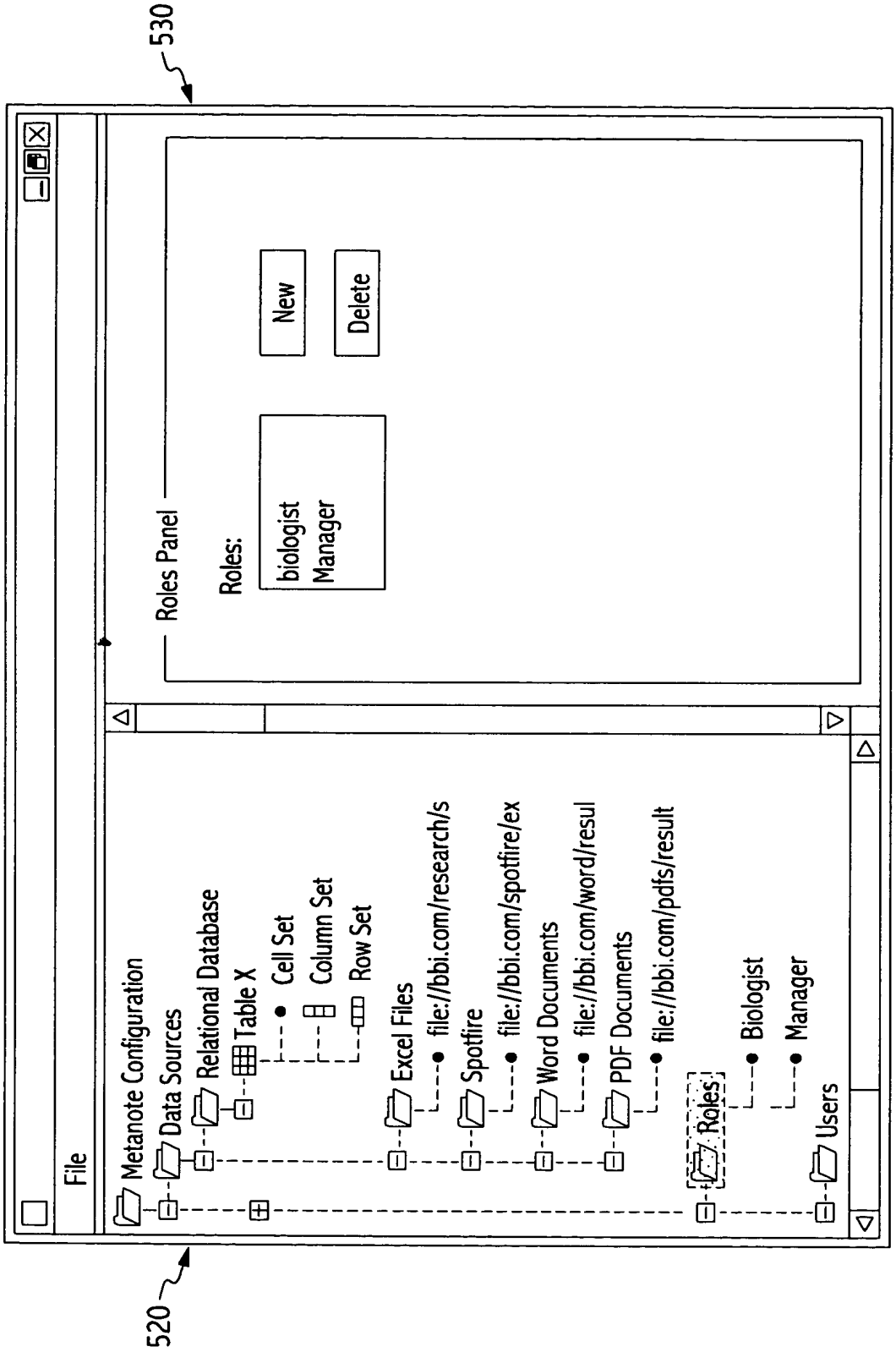
530
520
File
Metanote Configuration
Data Sources
Relational Database
Table X
Cell Set
Column Set
Row Set
Excel Files
file://bbi.com/research/s
Spotfire
file://bbi.com/spotfire/ex
Word Documents
file://bbi.com/word/resul
PDF Documents
file://bbi.com/pdfs/result
Roles
Biologist
Manager
Users
Roles Panel
Roles:
biologist
Manager
New
Delete

FIG. 5A

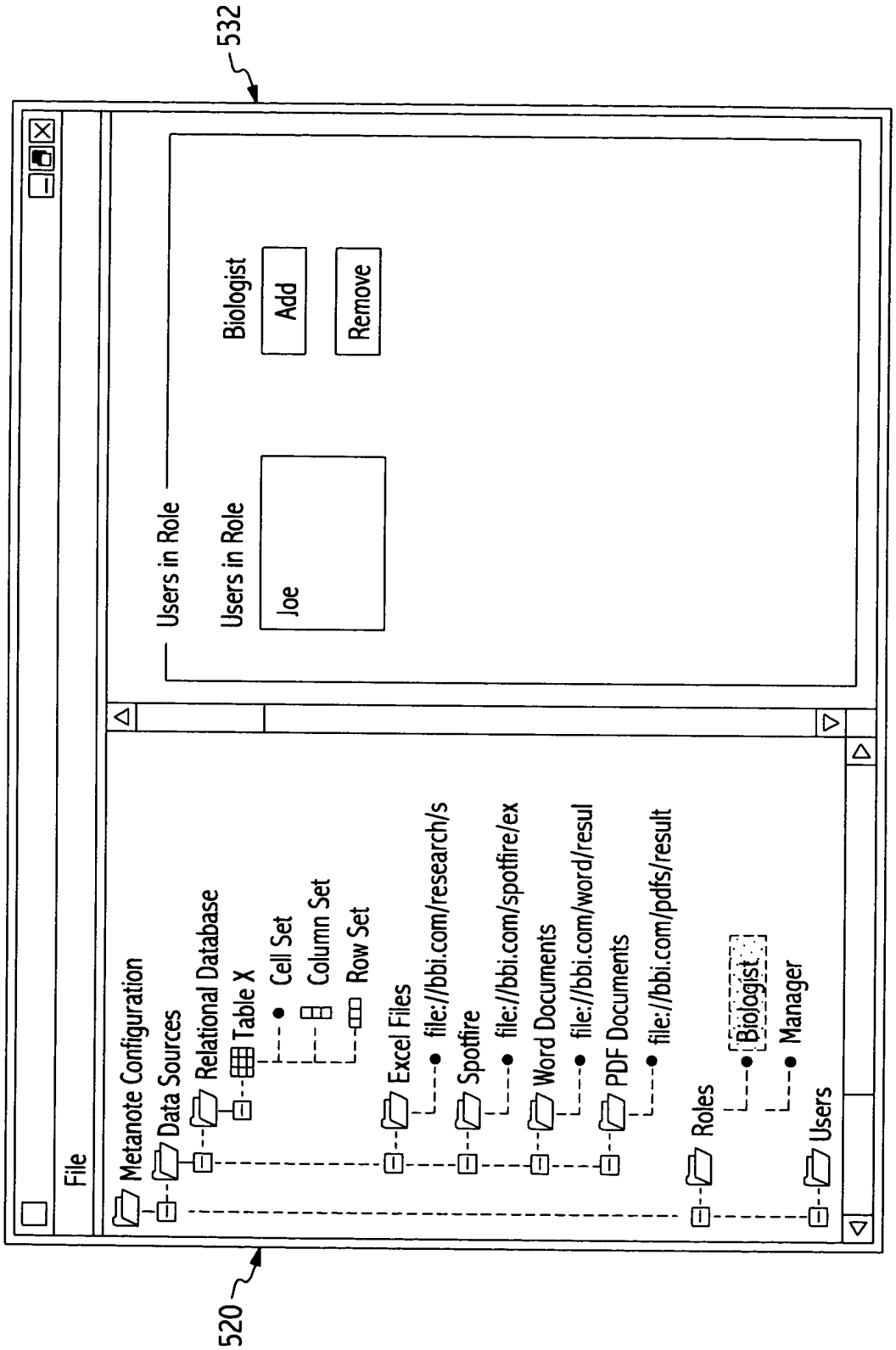
532
520
File
Metanote Configuration
Data Sources
Relational Database
Table X
Cell Set
Column Set
Row Set
Excel Files
file://bbi.com/research/s
Spotfire
file://bbi.com/spotfire/ex
Word Documents
file://bbi.com/word/resul
PDF Documents
file://bbi.com/pdfs/result
Roles
Biologist
Manager
Users
Users in Role
Users in Role
Joe
Biologist
Add
Remove

FIG. 5B

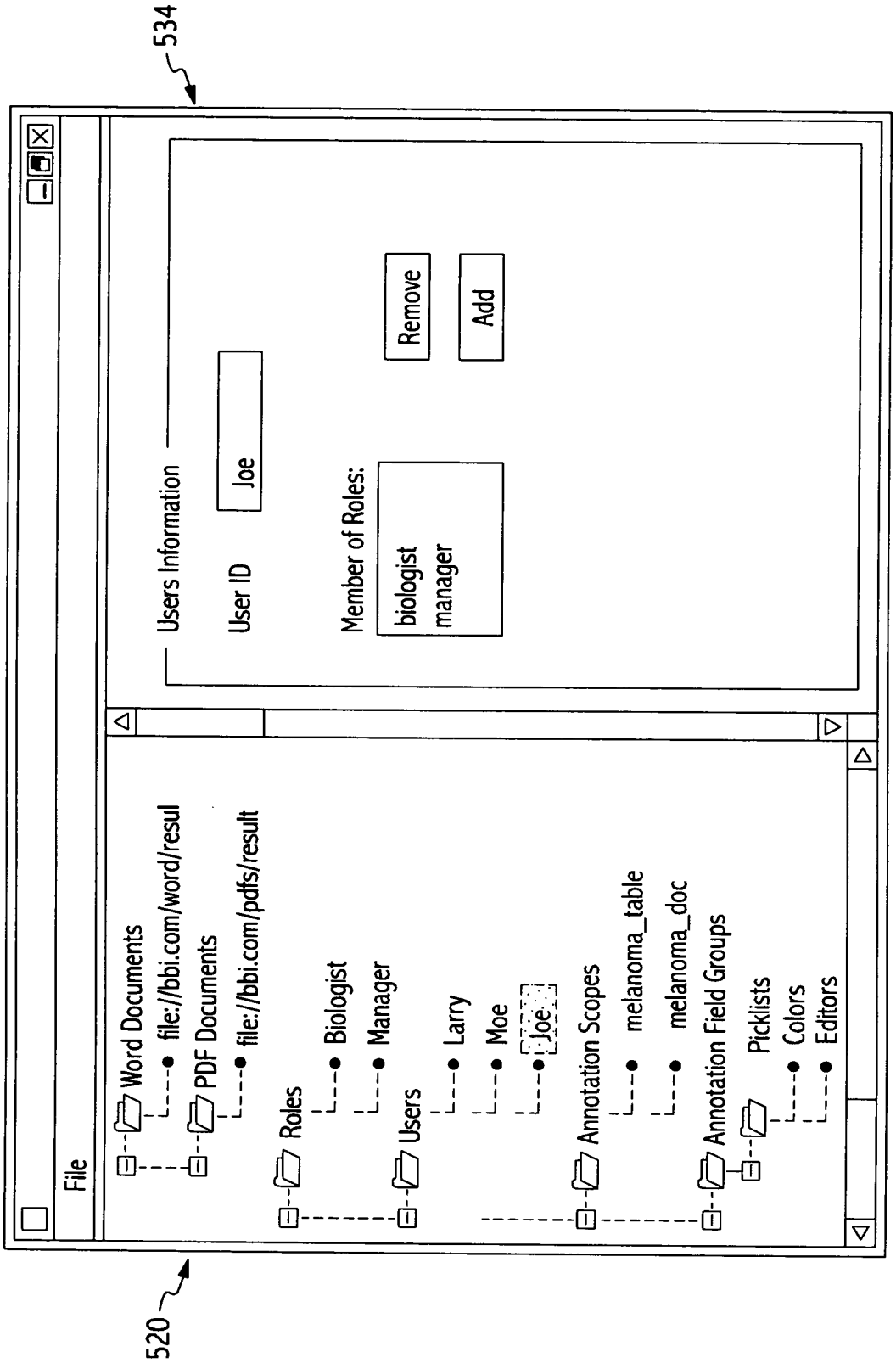
534
520
File
Word Documents
file://bbi.com/word/resul
PDF Documents
file://bbi.com/pdfs/result
Roles
Biologist
Manager
Users
Larry
Moe
Joe
Annotation Scopes
melanoma_table
melanoma_doc
Annotation Field Groups
Picklists
Colors
Editors
Users Information
User ID
Joe
Member of Roles:
biologist
manager
Remove
Add

FIG. 5C

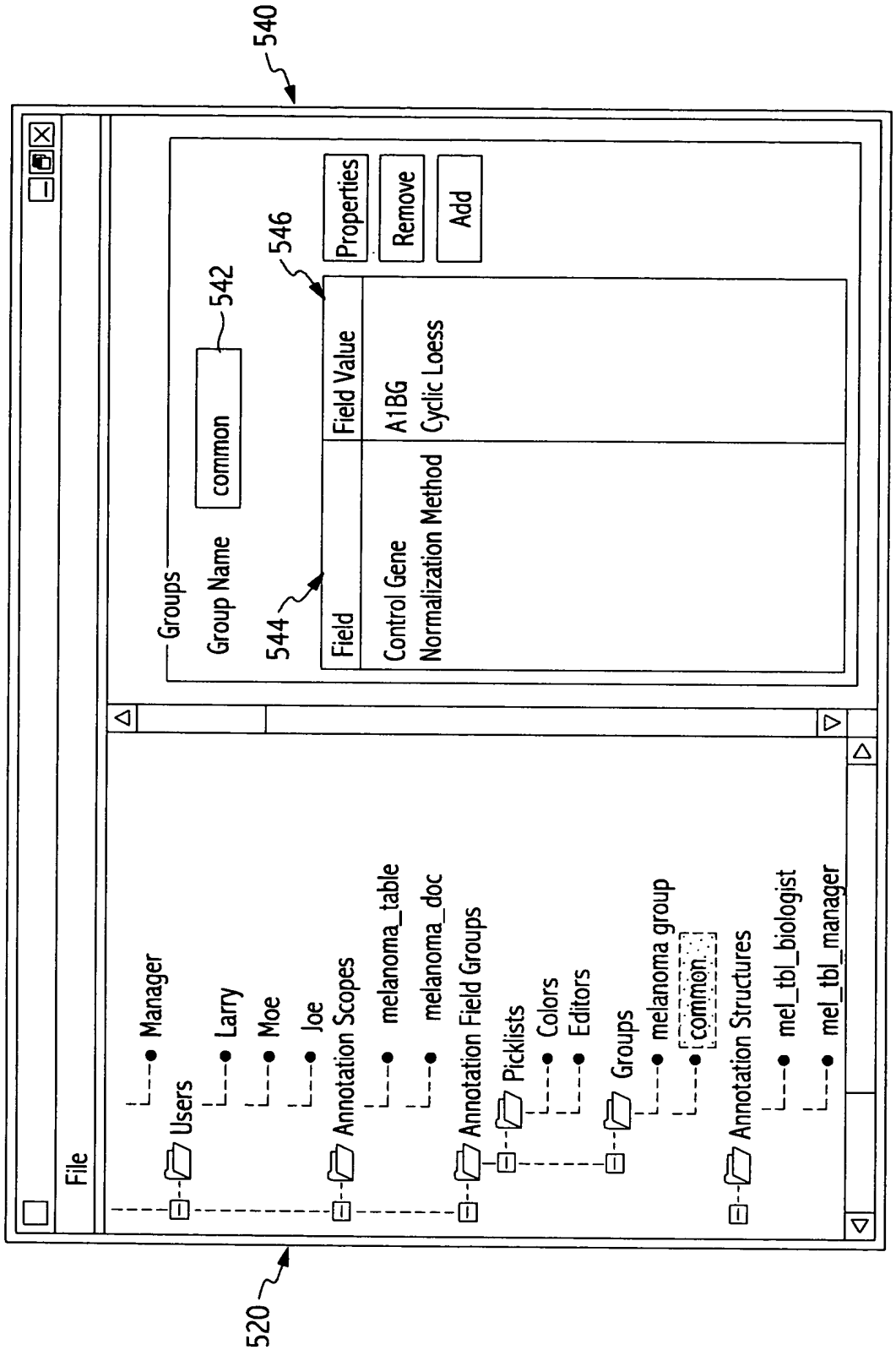
540
520
File
Manager
Users
Larry
Moe
Joe
Annotation Scopes
melanoma_table
melanoma_doc
Annotation Field Groups
Picklists
Colors
Editors
Groups
melanoma group
common
Annotation Structures
mel_tbl_biologist
mel_tbl_manager
Groups
Group Name
common
542
544
546
Field
Field Value
Control Gene
A1BG
Normalization Method
Cyclic Loess
Properties
Remove
Add

FIG. 5D

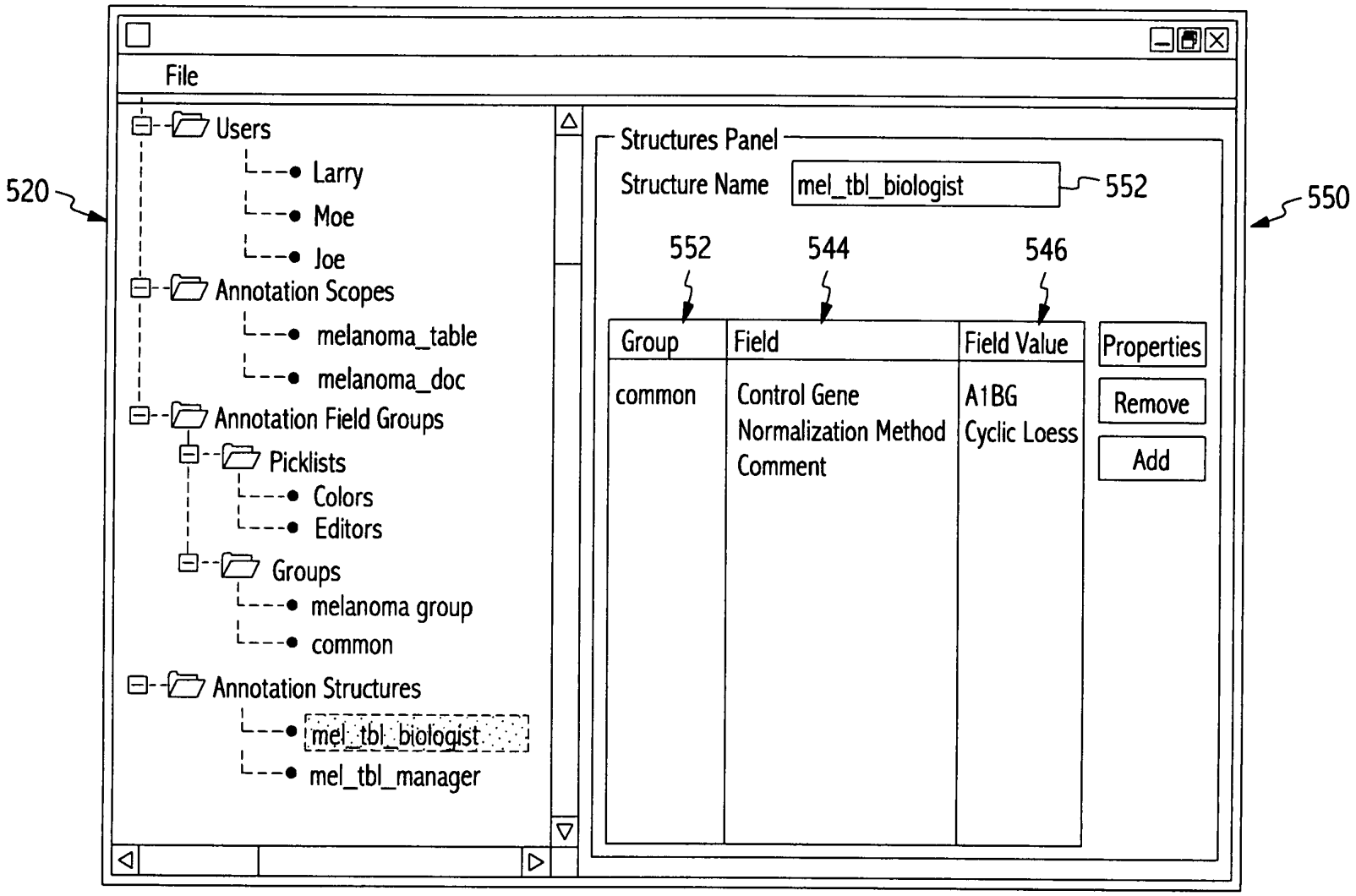
File
Users
Larry
Moe
Joe
Annotation Scopes
melanoma_table
melanoma_doc
Annotation Field Groups
Picklists
Colors
Editors
Groups
melanoma group
common
Annotation Structures
mel_tbl_biologist
mel_tbl_manager
520
Structures Panel
Structure Name
mel_tbl_biologist
552
550
552
544
546
Group
Field
Field Value
common
Control Gene
Normalization Method
Comment
A1BG
Cyclic Loess
Properties
Remove
Add

FIG. 5E

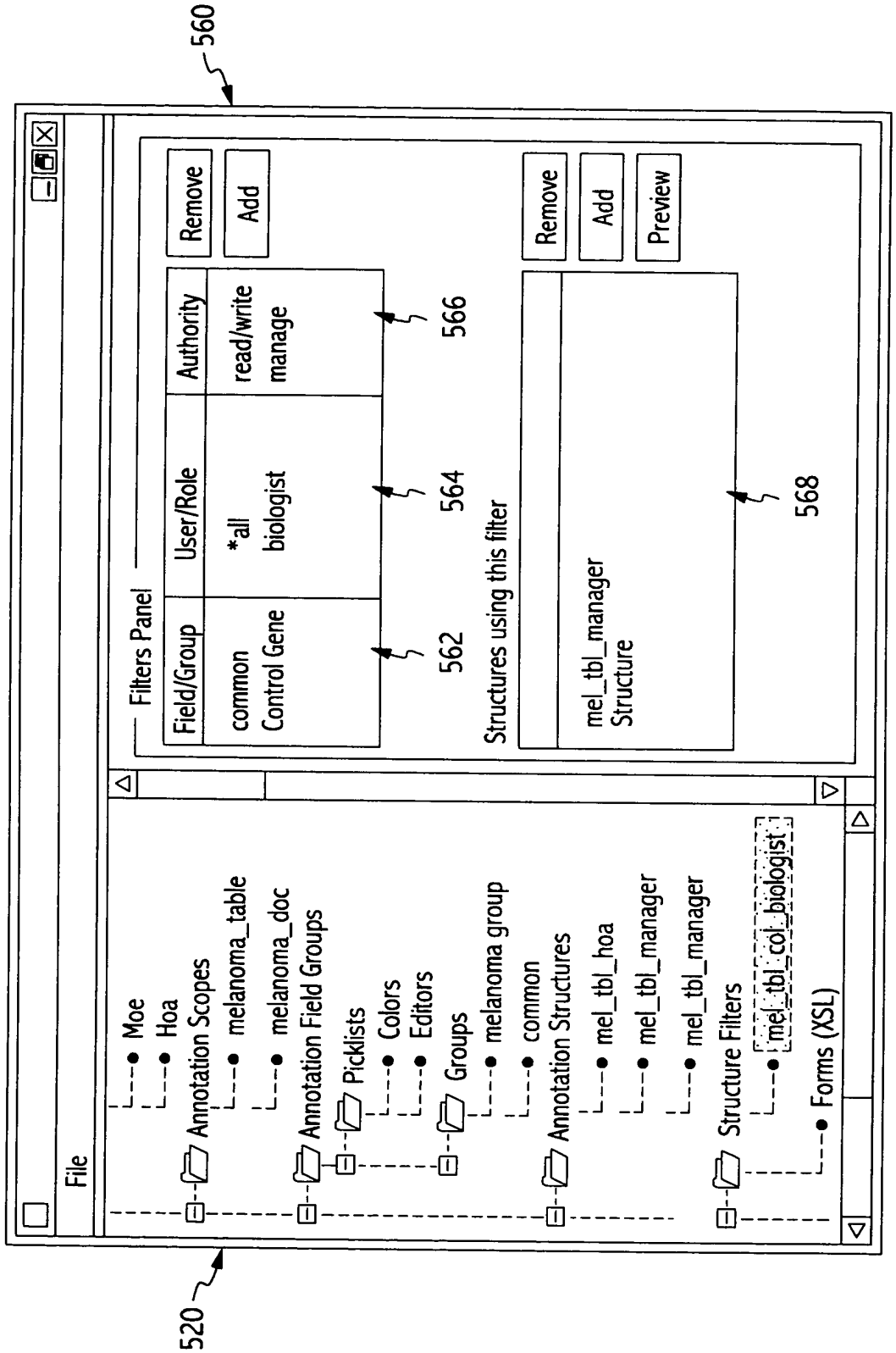
560
520
File
Moe
Hoa
Annotation Scopes
melanoma_table
melanoma_doc
Annotation Field Groups
Picklists
Colors
Editors
Groups
melanoma group
common
Annotation Structures
mel_tbl_hoa
mel_tbl_manager
mel_tbl_manager
Structure Filters
mel_tbl_col_biologist
Forms (XSL)
Filters Panel
Field/Group
User/Role
Authority
common
Control Gene
*all
biologist
read/write
manage
Remove
Add
562
564
566
Structures using this filter
mel_tbl_manager
Structure
Remove
Add
Preview
568

FIG. 5F

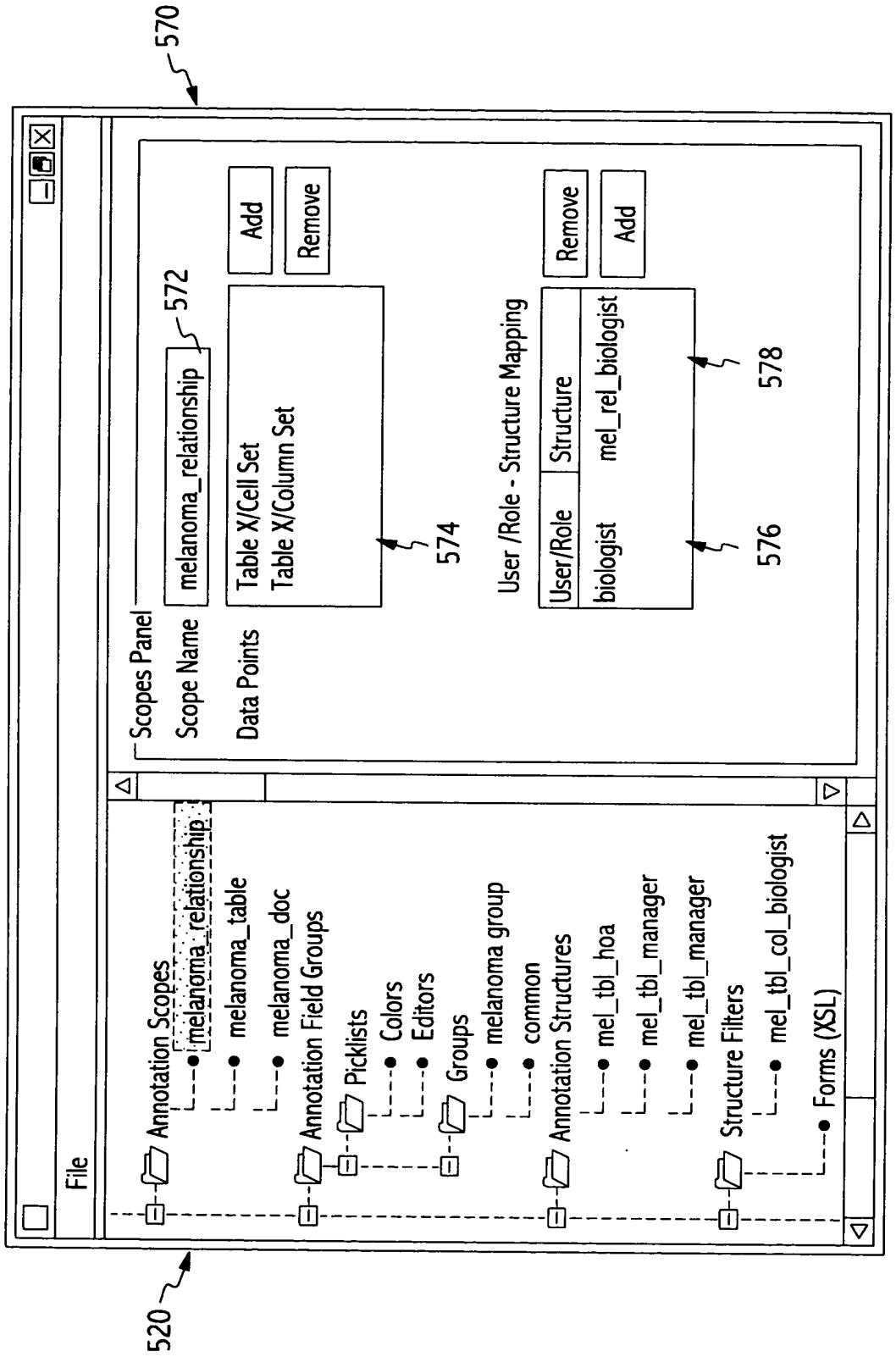
570
File
Annotation Scopes
melanoma_relationship
melanoma_table
melanoma_doc
Annotation Field Groups
Picklists
Colors
Editors
Groups
melanoma group
common
Annotation Structures
mel_tbl_hoa
mel_tbl_manager
mel_tbl_manager
Structure Filters
mel_tbl_col_biologist
Forms (XSL)
520
Scopes Panel
Scope Name
melanoma_relationship
572
Data Points
Table X/Cell Set
Table X/Column Set
Add
Remove
574
User /Role - Structure Mapping
User/Role
Structure
biologist
mel_rel_biologist
Remove
Add
576
578

FIG. 5G

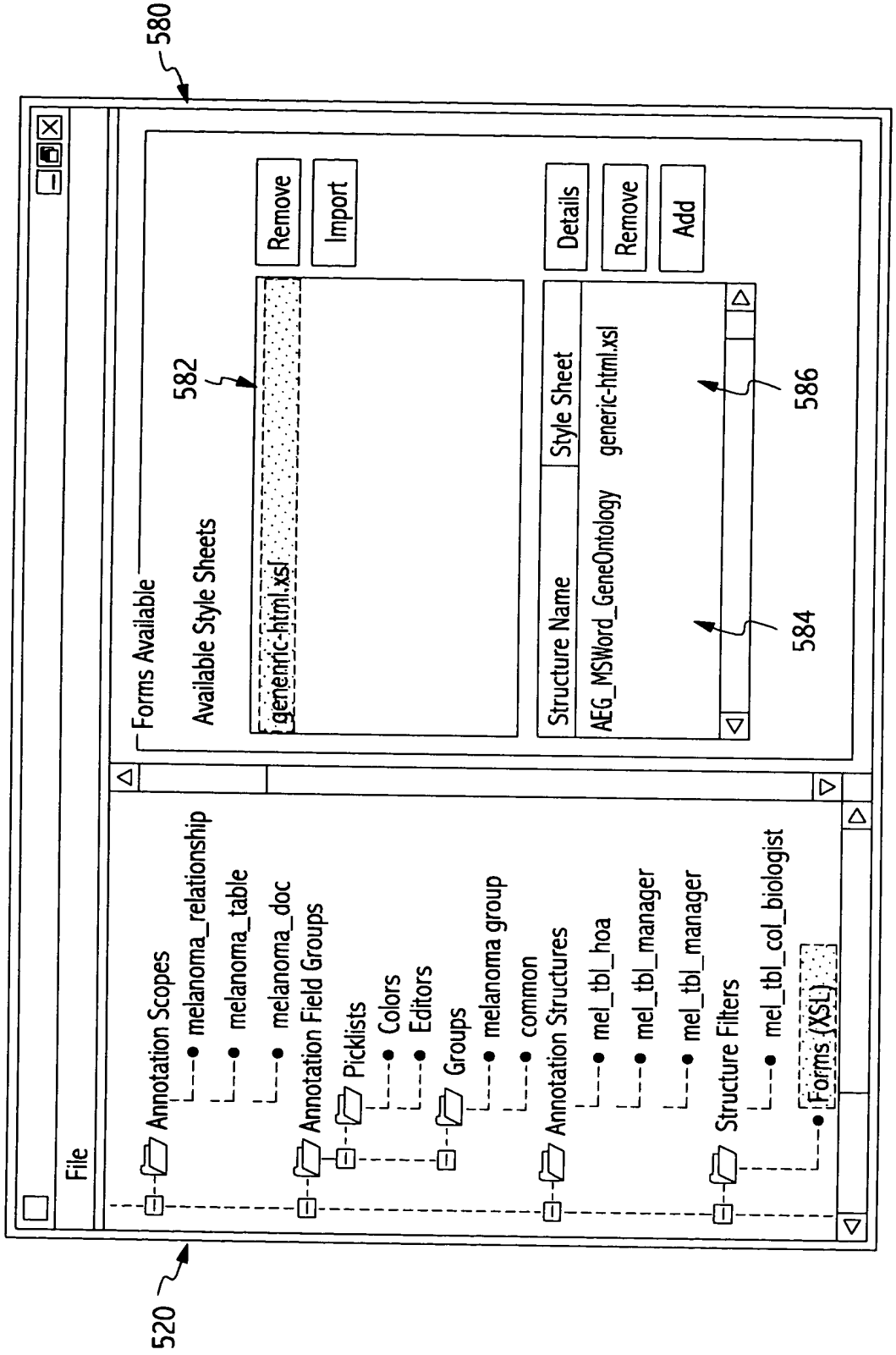
580
520
File
Annotation Scopes
melanoma_relationship
melanoma_table
melanoma_doc
Annotation Field Groups
Picklists
Colors
Editors
Groups
melanoma group
common
Annotation Structures
mel_tbl_hoa
mel_tbl_manager
mel_tbl_manager
Structure Filters
mel_tbl_col_biologist
Forms (XSL)
Forms Available
Available Style Sheets
582
generic-html.xsl
Remove
Import
Structure Name
Style Sheet
AEG_MSWord_GeneOntology
generic-html.xsl
Details
Remove
Add
584
586

FIG. 5H

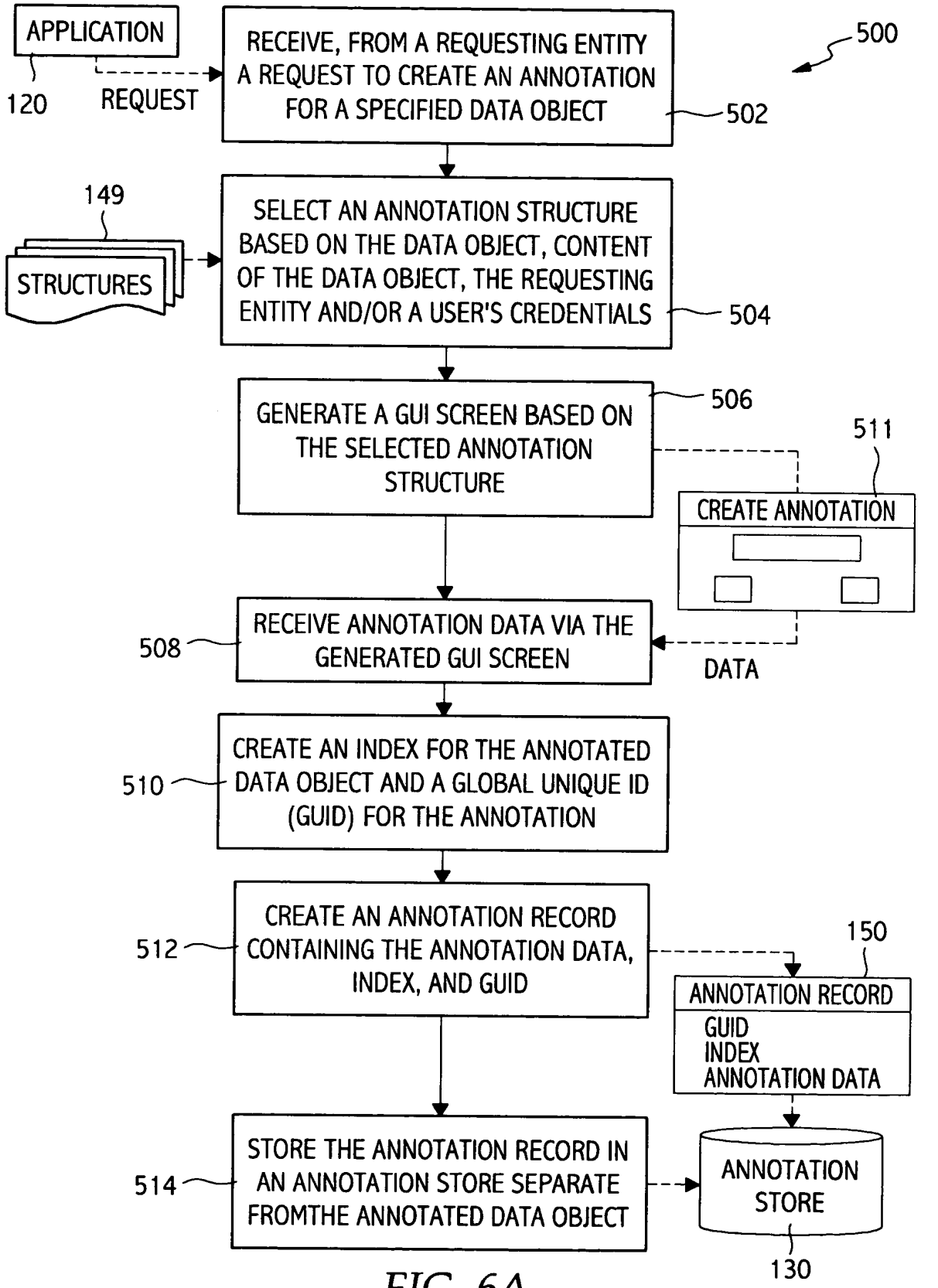
APPLICATION
120
REQUEST
RECEIVE, FROM A REQUESTING ENTITY A REQUEST TO CREATE AN ANNOTATION FOR A SPECIFIED DATA OBJECT
502
500
149
STRUCTURES
SELECT AN ANNOTATION STRUCTURE BASED ON THE DATA OBJECT, CONTENT OF THE DATA OBJECT, THE REQUESTING ENTITY AND/OR A USER'S CREDENTIALS
504
GENERATE A GUI SCREEN BASED ON THE SELECTED ANNOTATION STRUCTURE
506
511
CREATE ANNOTATION
RECEIVE ANNOTATION DATA VIA THE GENERATED GUI SCREEN
508
DATA
CREATE AN INDEX FOR THE ANNOTATED DATA OBJECT AND A GLOBAL UNIQUE ID (GUID) FOR THE ANNOTATION
510
CREATE AN ANNOTATION RECORD CONTAINING THE ANNOTATION DATA, INDEX, AND GUID
512
150
ANNOTATION RECORD
GUID
INDEX
ANNOTATION DATA
STORE THE ANNOTATION RECORD IN AN ANNOTATION STORE SEPARATE FROMTHE ANNOTATED DATA OBJECT
514
ANNOTATION STORE
130

FIG. 6A

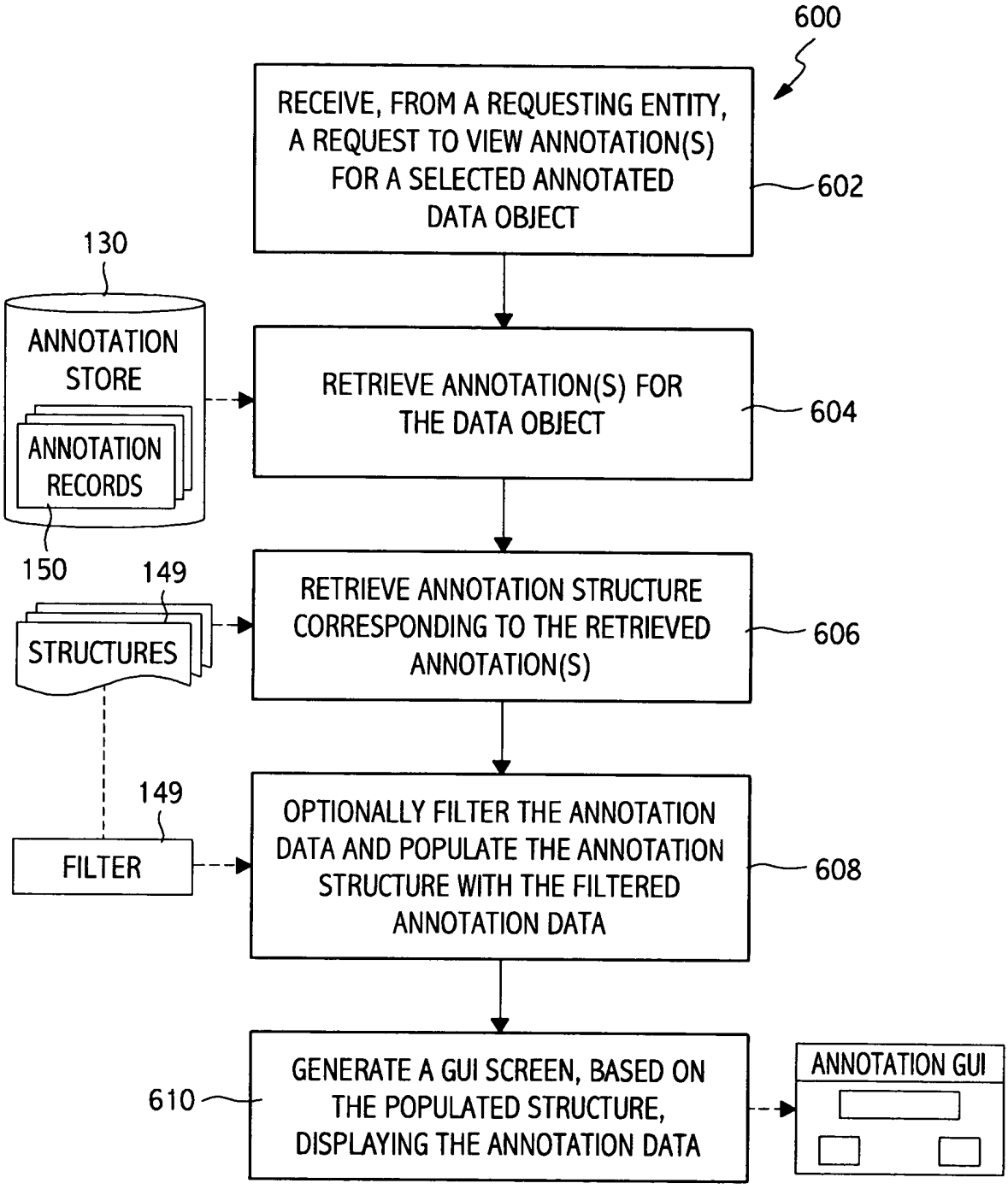
600
RECEIVE, FROM A REQUESTING ENTITY, A REQUEST TO VIEW ANNOTATION(S) FOR A SELECTED ANNOTATED DATA OBJECT
602
130
ANNOTATION STORE
ANNOTATION RECORDS
150
RETRIEVE ANNOTATION(S) FOR THE DATA OBJECT
604
149
STRUCTURES
RETRIEVE ANNOTATION STRUCTURE CORRESPONDING TO THE RETRIEVED ANNOTATION(S)
606
149
FILTER
OPTIONALLY FILTER THE ANNOTATION DATA AND POPULATE THE ANNOTATION STRUCTURE WITH THE FILTERED ANNOTATION DATA
608
610
GENERATE A GUI SCREEN, BASED ON THE POPULATED STRUCTURE, DISPLAYING THE ANNOTATION DATA
ANNOTATION GUI

FIG. 6B

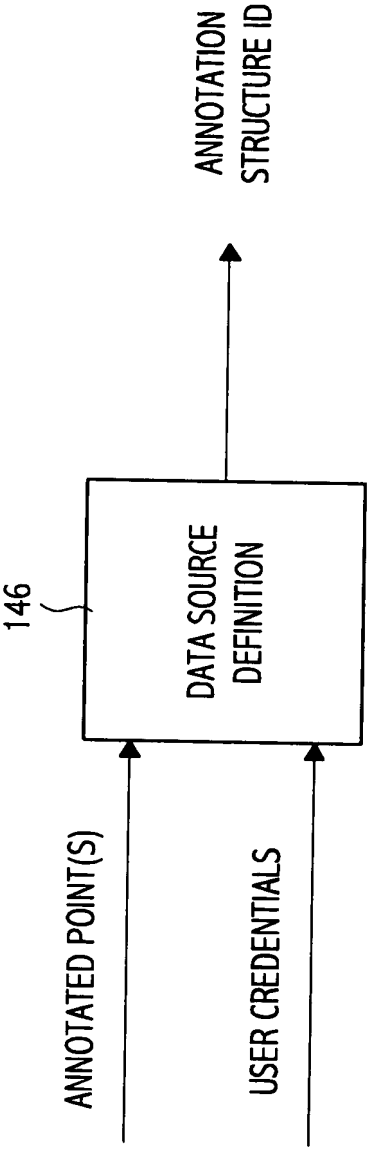
ANNOTATION STRUCTURE ID
146
DATA SOURCE DEFINITION
ANNOTATED POINT(S)
USER CREDENTIALS

FIG. 7A

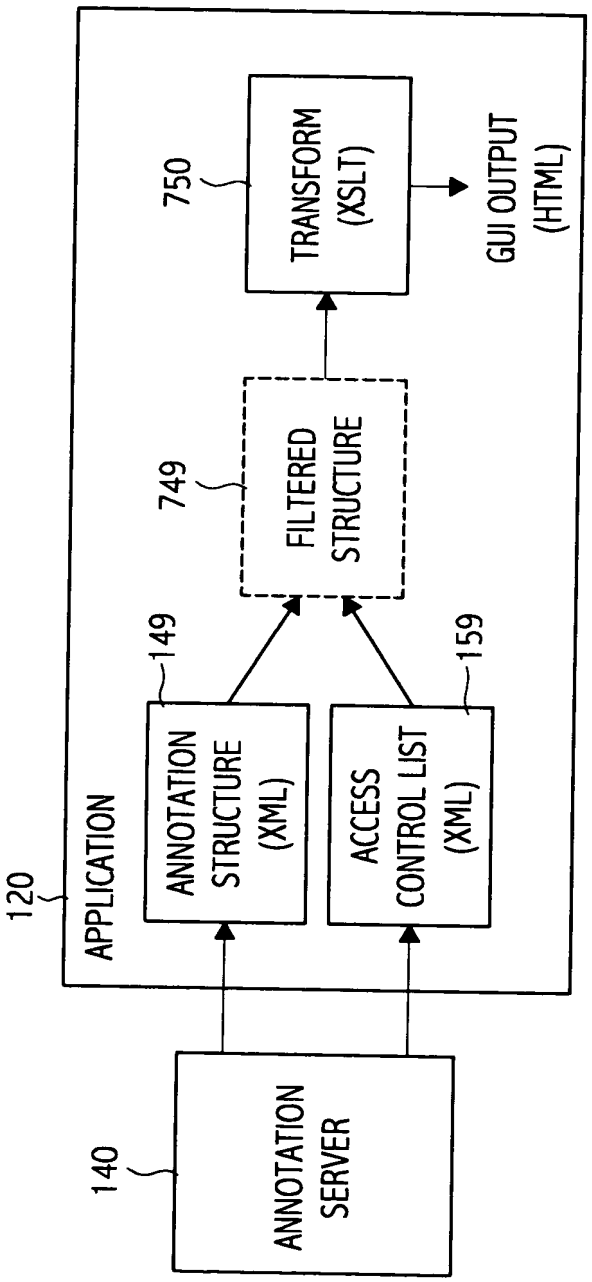
120
APPLICATION
140
ANNOTATION SERVER
149
ANNOTATION STRUCTURE (XML)
159
ACCESS CONTROL LIST (XML)
749
FILTERED STRUCTURE
750
TRANSFORM (XSLT)
GUI OUTPUT (HTML)

FIG. 7B

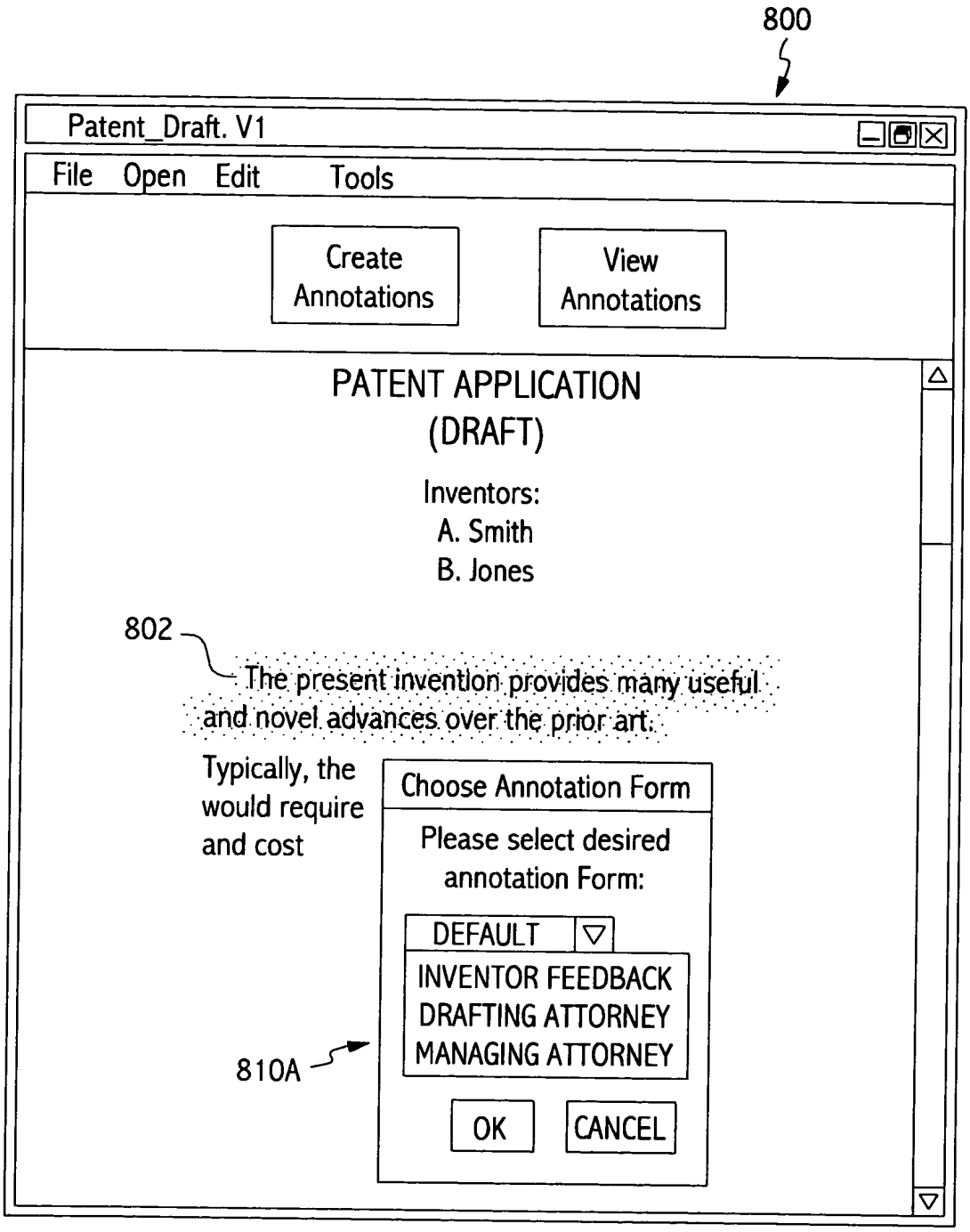
800
Patent_Draft. V1
File Open Edit Tools
Create Annotations
View Annotations
PATENT APPLICATION
(DRAFT)
Inventors:
A. Smith
B. Jones
802
The present invention provides many useful and novel advances over the prior art.
Typically, the would require and cost
Choose Annotation Form
Please select desired annotation Form:
DEFAULT
INVENTOR FEEDBACK
DRAFTING ATTORNEY
MANAGING ATTORNEY
810A
OK
CANCEL

FIG. 8A

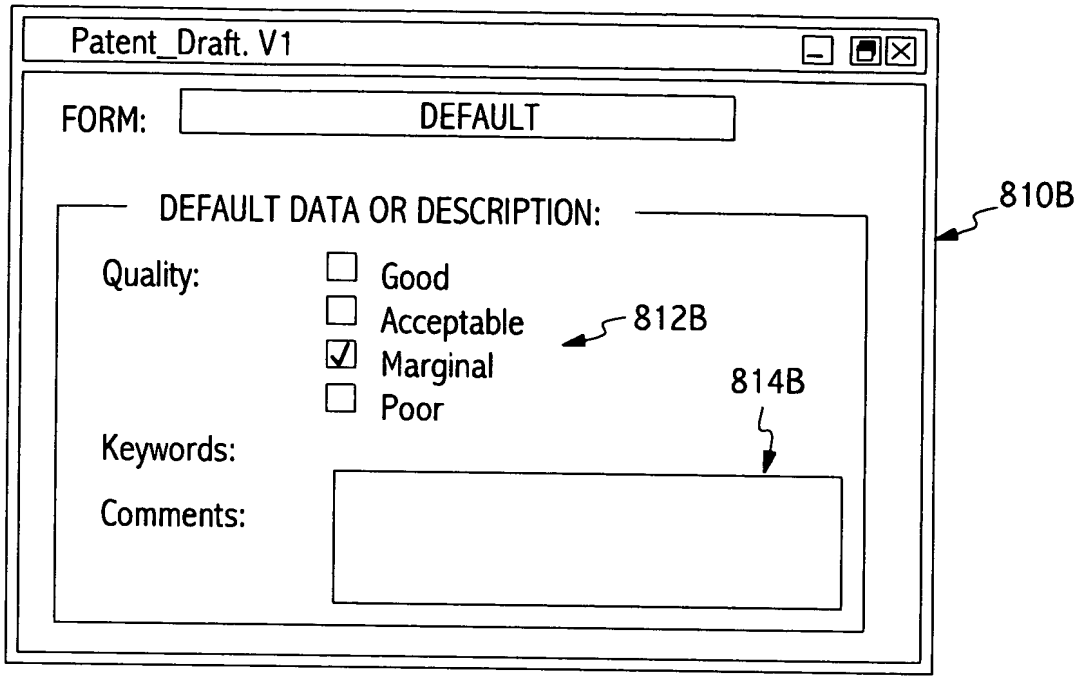
Patent_Draft. V1
FORM:
DEFAULT
DEFAULT DATA OR DESCRIPTION:
Quality:
Good
Acceptable
Marginal
Poor
Keywords:
Comments:
810B
812B
814B

FIG. 8B

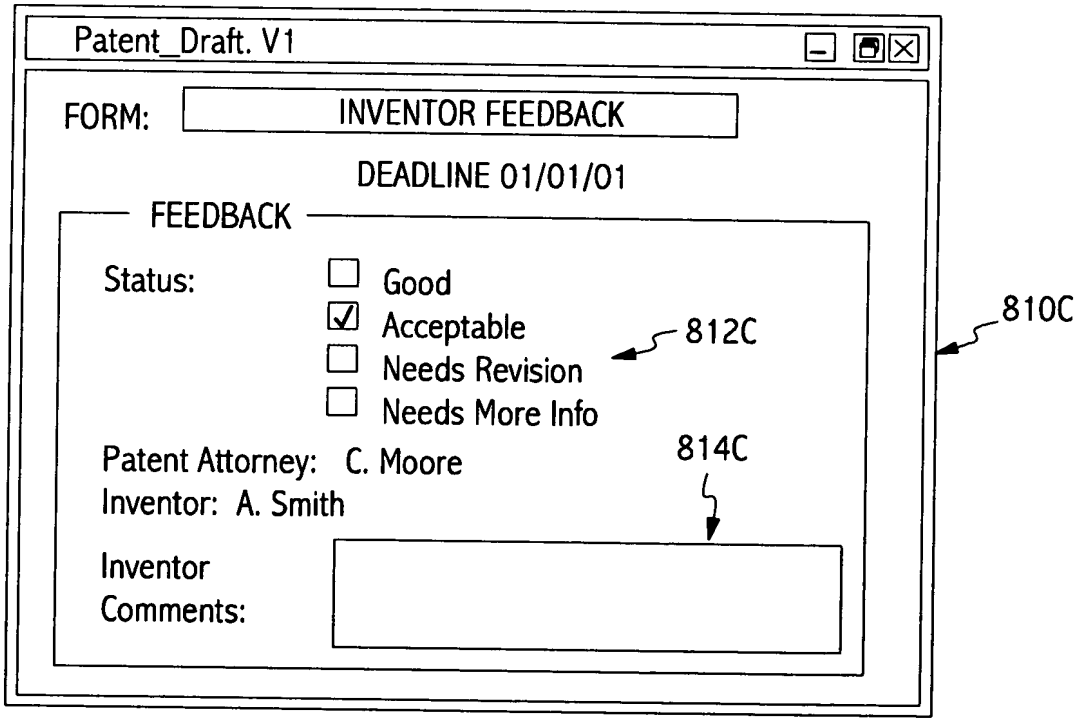
Patent_Draft. V1
FORM:
INVENTOR FEEDBACK
DEADLINE 01/01/01
FEEDBACK
Status:
Good
Acceptable
Needs Revision
Needs More Info
Patent Attorney: C. Moore
Inventor: A. Smith
Inventor
Comments:
810C
812C
814C

FIG. 8C

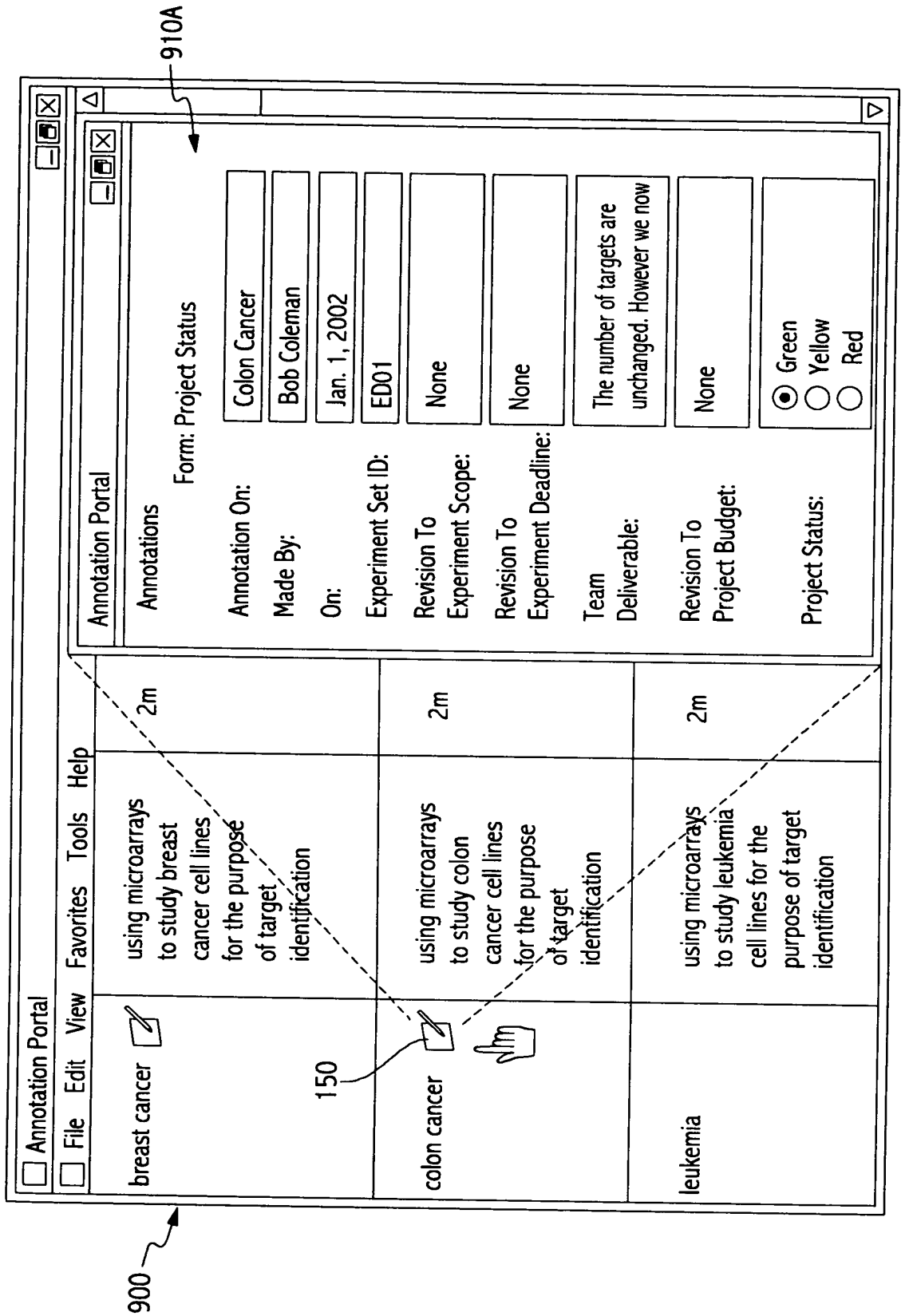
900
910A
Annotation Portal
File Edit View Favorites Tools Help
breast cancer
colon cancer
leukemia
using microarrays to study breast cancer cell lines for the purpose of target identification
using microarrays to study colon cancer cell lines for the purpose of target identification
using microarrays to study leukemia cell lines for the purpose of target identification
2m
2m
2m
150
Annotation Portal
Annotations
Form: Project Status
Annotation On:
Colon Cancer
Made By:
Bob Coleman
On:
Jan. 1, 2002
Experiment Set ID:
ED01
Revision To Experiment Scope:
None
Revision To Experiment Deadline:
None
Team Deliverable:
The number of targets are unchanged. However we now
Revision To Project Budget:
None
Project Status:
Green
Yellow
Red

FIG. 9A

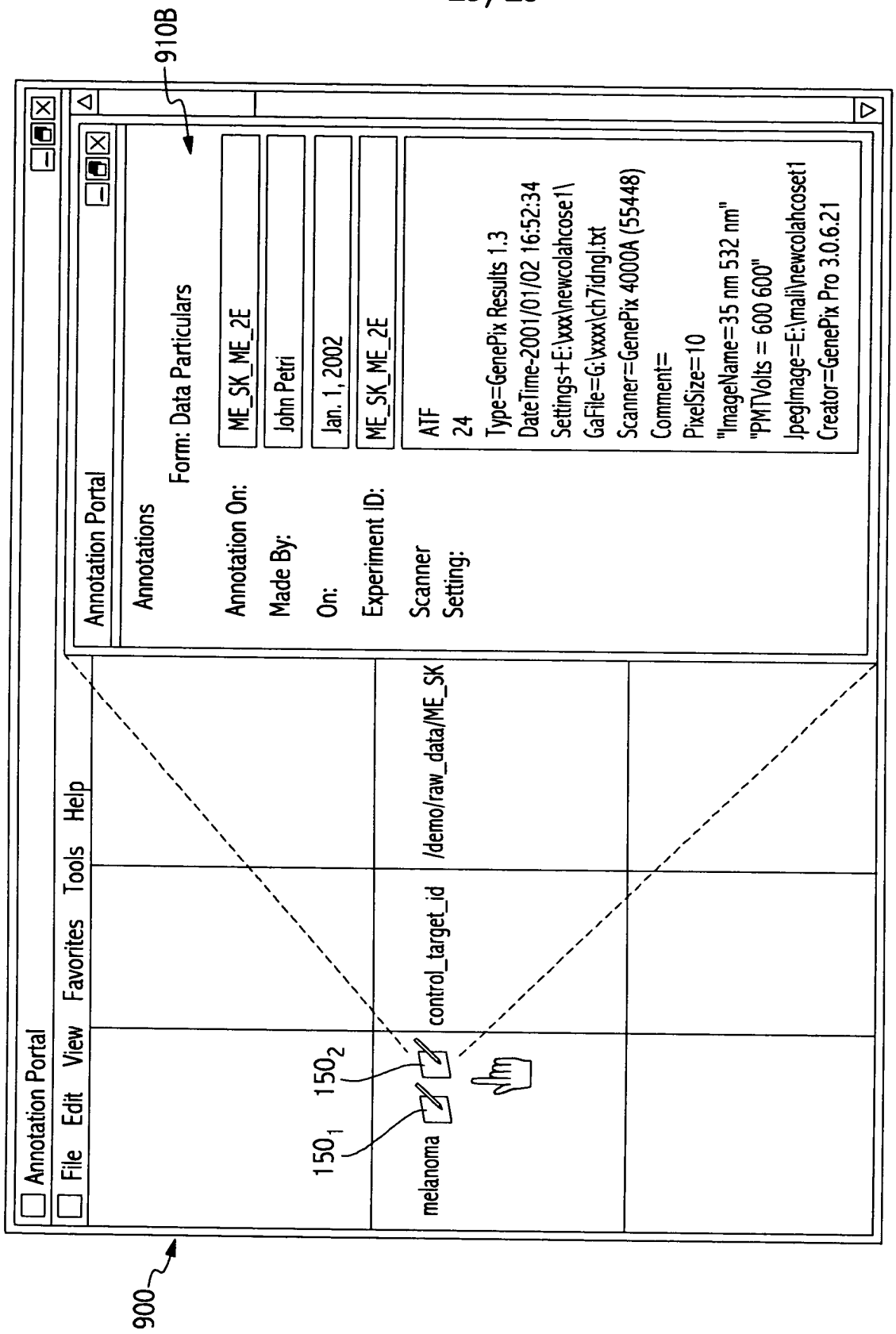
910B
900
Annotation Portal
File Edit View Favorites Tools Help
Annotation Portal
Annotations
Form: Data Particulars
Annotation On:
Made By:
On:
Experiment ID:
Scanner Setting:
ME_SK_ME_2E
John Petri
Jan. 1, 2002
ME_SK_ME_2E
ATF
24
Type=GenePix Results 1.3
DateTime-2001/01/02 16:52:34
Settings+E:\xxx\newcolahcose1\
GaFile=G:\xxxx\ch7idngl.txt
Scanner=GenePix 4000A (55448)
Comment=
PixelSize=10
"ImageName=35 nm 532 nm"
"PMTVolts = 600 600"
JpegImage=E:\mali\newcolahcoset1
Creator=GenePix Pro 3.0.6.21
/demo/raw_data/ME_SK
control_target_id
melanoma
150₁
150₂

FIG. 9B

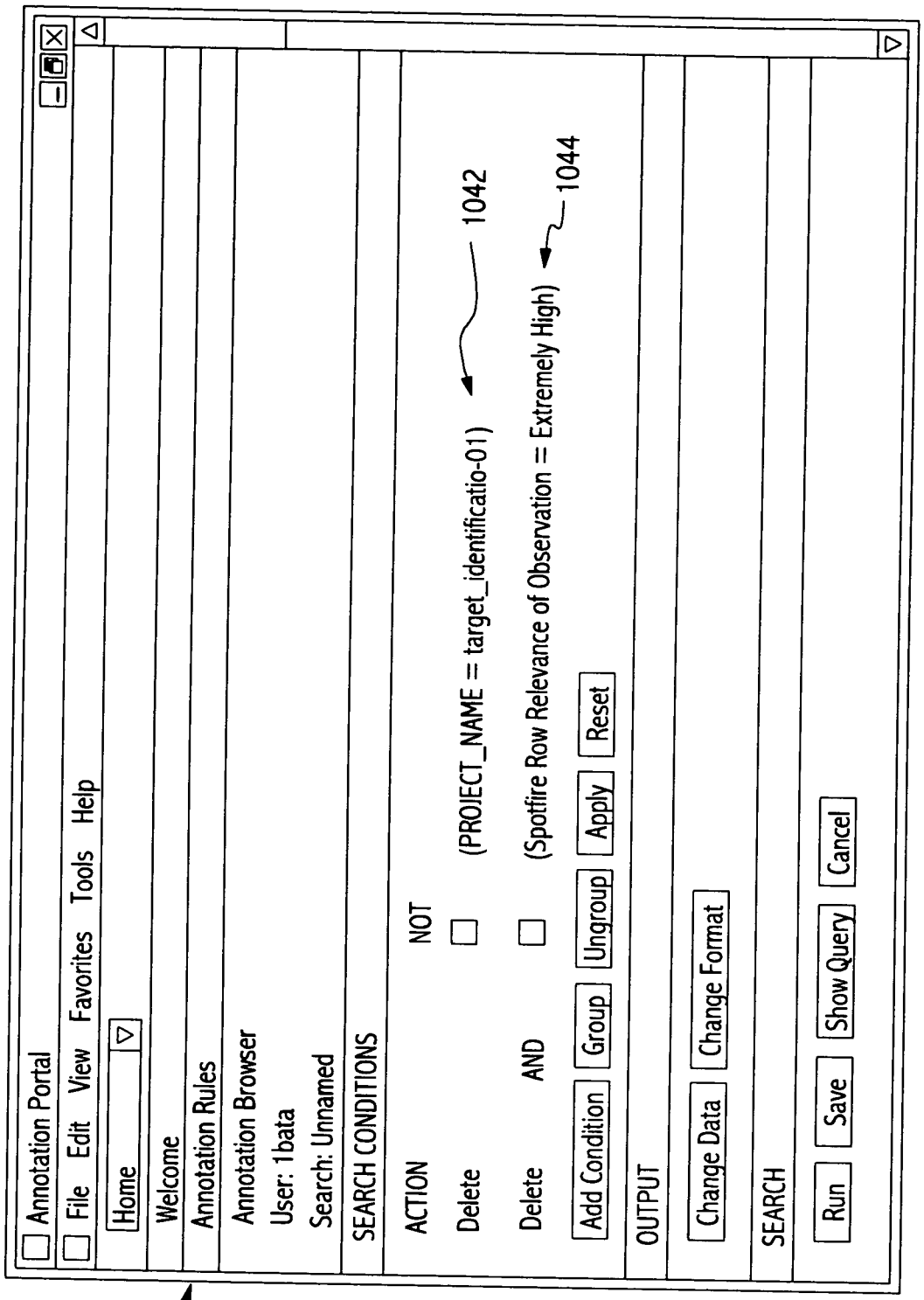
Annotation Portal
File Edit View Favorites Tools Help
Home
Welcome
Annotation Rules
Annotation Browser
User: 1bata
Search: Unnamed
SEARCH CONDITIONS
ACTION
NOT
Delete
(PROJECT_NAME = target_identificatio-01)
1042
Delete
AND
(Spotfire Row Relevance of Observation = Extremely High)
1044
Add Condition
Group
Ungroup
Apply
Reset
OUTPUT
Change Data
Change Format
SEARCH
Run
Save
Show Query
Cancel
1040

FIG. 10A

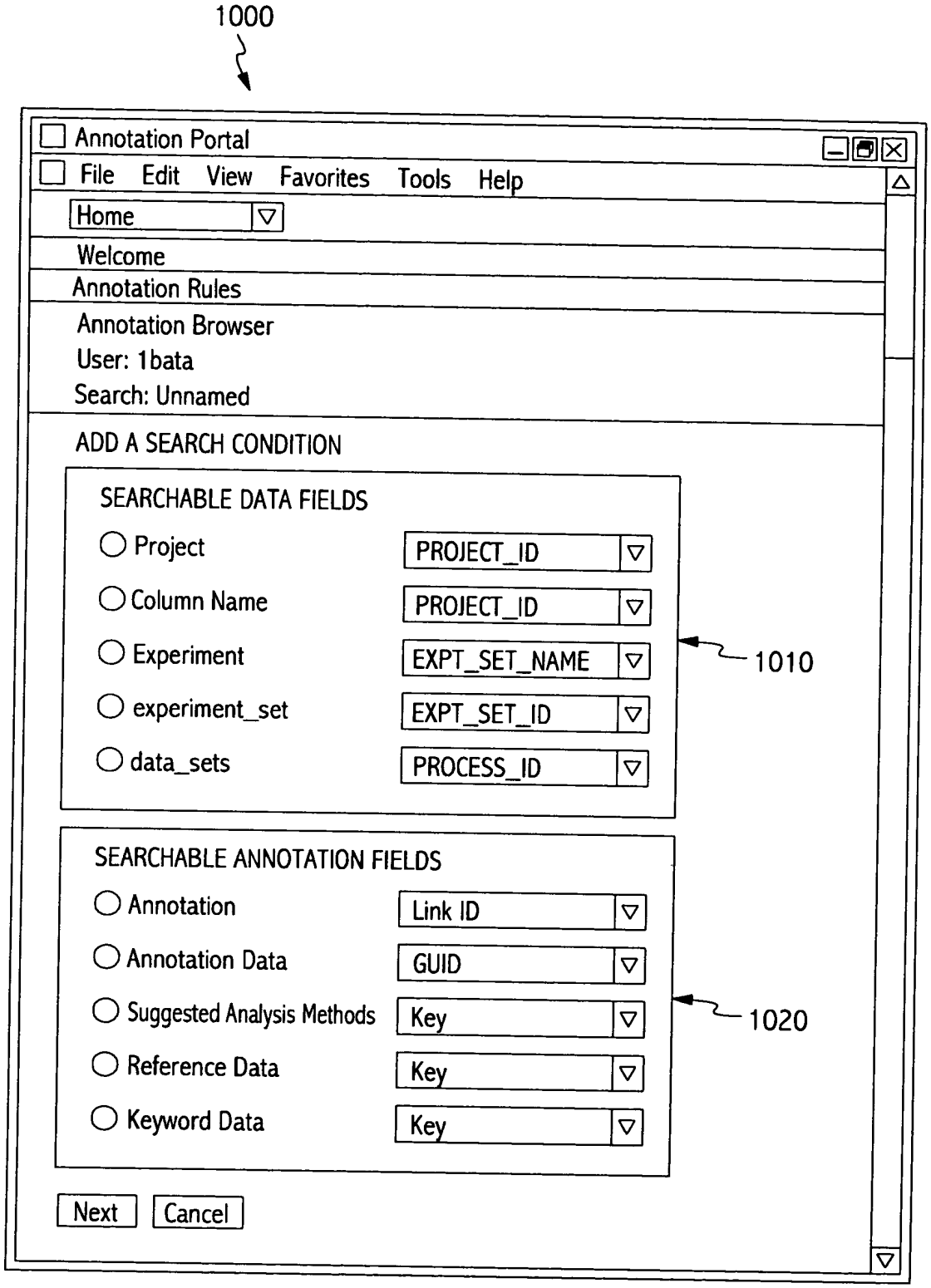
1000
Annotation Portal
File Edit View Favorites Tools Help
Home
Welcome
Annotation Rules
Annotation Browser
User: 1bata
Search: Unnamed
ADD A SEARCH CONDITION
SEARCHABLE DATA FIELDS
Project
PROJECT_ID
Column Name
PROJECT_ID
Experiment
EXPT_SET_NAME
experiment_set
EXPT_SET_ID
data_sets
PROCESS_ID
1010
SEARCHABLE ANNOTATION FIELDS
Annotation
Link ID
Annotation Data
GUID
Suggested Analysis Methods
Key
Reference Data
Key
Keyword Data
Key
1020
Next
Cancel

FIG. 10B

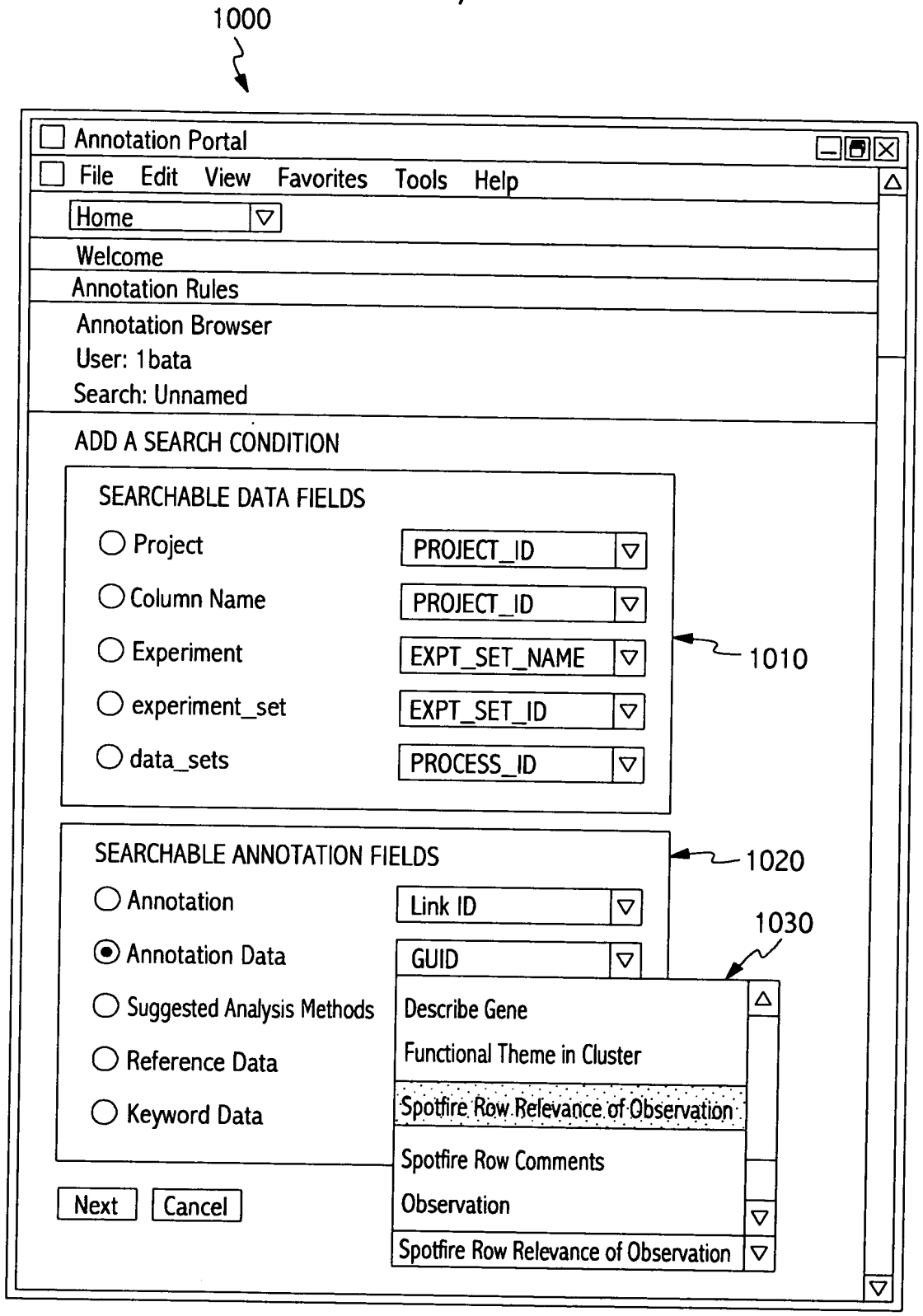
1000
Annotation Portal
File Edit View Favorites Tools Help
Home
Welcome
Annotation Rules
Annotation Browser
User: 1bata
Search: Unnamed
ADD A SEARCH CONDITION
SEARCHABLE DATA FIELDS
Project
PROJECT_ID
Column Name
PROJECT_ID
Experiment
EXPT_SET_NAME
experiment_set
EXPT_SET_ID
data_sets
PROCESS_ID
1010
SEARCHABLE ANNOTATION FIELDS
1020
Annotation
Link ID
Annotation Data
GUID
1030
Suggested Analysis Methods
Reference Data
Keyword Data
Describe Gene
Functional Theme in Cluster
Spotfire Row Relevance of Observation
Spotfire Row Comments
Observation
Spotfire Row Relevance of Observation
Next
Cancel

FIG. 10C